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Studies on the Chironomid Midges Collected on the Shore of Shimanto River in April, 1998.

Part 1. Description of Species of the Subfamily Chironominae

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Abstract: Collection of “yusurika”, or insects of the family Chironomidae, were conducted during the period from April 25 to 27, 1998, at 10 localities along Shimanto River in western Shikoku, Japan by daytime collections with insects net, and night collections with a light trap. The specimens collected were preserved in 70% alcohol, and were individually mounted on slides in gum-chloral medium after dissected. A total of 320 male specimens have so far been examined, and 144 among them were found to be belonging to the subfamily Chironominae, and the rests to Orthocladiinae and Tanypodinae. Those belonging to the first subfamily were further classified into 42 species, among which as many as 24 are described in this paper as new species. It should especially been noted that the species belonging to the 3 genera of Tribe Tanytarsini, *Cladotanytarsus*, *Micropsectra* and *Tanytarsus*, are classified into 10 species, among which *Tanytarsus oyamai* Sasa, 1979, is the only one previously recorded, and the rests 9 were the new species. It has again been demonstrated that the Shimanto River basin is very rich in the insect fauna and many new species were collected at the present survey.

Key words: Chironominae, Medical entomology, New species, Shimanto River, Yusurika.

INTRODUCTION

Shimanto is the longest river in Shikoku Island, western Japan, and running mainly through the mountainous regions, has the maximum length of 196km, with at least 345 branch streams, the basin area of 2,270 square km and a population of about 107,000. This river is especially noted as the breeding source of many aquatic animals and plants associated with relatively clean water qualities, including very rare species, but this is the first time that the chironomid midges breeding along this river are studied.

Collections of adult chironomid midges were conducted by us at 10 localities from the

mouth to the upstream sites along the shore of this river, on 25 to 27 April, 1998, by daytime collections with insect net, and nighttime collections with light traps. The specimens were preserved in 70% ethylalcohol, and 250 male specimens among them were individually mounted on slides in gum-chloral medium. A total of 144 specimens among them were found to be belonging to the subfamily Chironominae, and the rests were those of the subfamilies Orthocladiinae or Tanypodinae. The present paper deals with the results of taxonomical studies of those belonging to the first subfamily, and those belonging to the other two subfamilies will be described in the following paper. Those belonging to the subfamily Chironominae were further classified into 42 species, among which 24 are described here as new species.

MATERIALS AND METHODS

Two different methods were used for the collection of the adult chironomids, daytime collection with insect net of the adult chironomids swarming in the air or resting in bushes on the shore of the river, and nighttime collection with a light trap equipped with 6 watt black fluorescent lamp. The specimens collected were preserved in 70% alcohol in glass tubes, and were individually mounted on slides in gum-chloral medium. The methods of collection, microscopic examination, standard measurements, and nomenclature are as described in the monograph of the Chironomidae of Japan published by Sasa and Kikuchi (1995). As for the preparation of the slide mounted specimens, an improved method being published by Suzuki is introduced.

The collection sites of the specimens were as follows. The date of collection was April 25 in #1 to #3, April 26 in #4 to #9, and April 27 in #10.

- # 1. At the side of the river near the mouth, in Nakamura, with insect nets.
- # 2. Yachou Koen, Nakamura, on the side of the river, with insect net.
- # 3. Tombo Koen, Nakamura, at the side of the river, with insect net.
- # 4. In the town of Nakamura, night collection with a light trap.
- # 5. Nishitosa Ohashi, Nishitosamura, with insect nets.
- # 6. Ekawasaki, Nishitosamura, with insect net.
- # 7. At a downstream site of the branch river Hiromigawa, with insect net.
- # 8. At the side of a branch river Kubogawa, with insect net.
- # 9. At an upstream site Hiyoshi-mura, with insect net.
- #10. At Hiromi-machi, on the middle reach of Hiromi River, with a light trap.

Taxonomic and morphological notes on the species collected

1. *Chironomus kiiensis* Tokunaga, 1936

A male was collected; No. 359:21 (#10-3).

2. *Chironomus nipponensis* Tokunaga, 1940

A male was collected; No. 358:01 (#1-1).

3. *Chironomus salinarius* Kiffer, 1921

A male was collected; No. 358:08 (#2-1).

4. *Chironomus samoensis* Edwards, 1928

Five males were collected; No. 359:19 (#10-1).

5. *Chironomus yoshimatsui* Martin et Sublette, 1972

Thirty one males were collected, among which 3 were confirmed as slide mounted specimens; No. 358:41(#4-1), 358: 42 (#4-2), 360:09 (#3-1).

6. *Chironomus* sp. "*shimantoabeus*" (Fig. 1)

An unusual mosaic specimen was collected; No. 359: 20 (#10-2). BL 5.70mm, WL 3.32mm, WW/WL 0.30. Ground color of scutum, and scutellum yellow, stripes and postnotum dark brown, leg segments largely yellow but front tibia dark brown, tips of all femora, and of middle and hind tibiae brown, abdominal tergites largely brown and each with a narrow yellow band along caudal margin. Head in Fig. 1 a. Eyes bare, ER 0.23. Frontal tubercles (Fig. 1 b) large, 15 microns long, 9 microns in diameter, and 40 microns apart from each other. Antenna composed of a small pedicel, and 5 short flagellar segments, typical as that of a female *Chironomus*, AR 0.52, AHR 0.38. Palp long, P/H 1.41. SO 28:26, CL 24. Anteprepronotum (Fig. 1 c) narrowly united in the middle, without setae. Distribution of setae on scutum and scutellum in Fig. 1 d; DM 22, DL 28: 28, PA 6:6, SC 30.

Wing (Fig. 1 e) bare, smooth and without dark areas. Squama with 16 fringe hairs, anal lobe nearly rectangular. RR 0.26, VR 1.04, R/Cu 1.14, a typical pattern as a female of *Chironomus*. Tip of front tibia (Fig. 1 f) with a broad and rounded terminal scale. Tips of middle and hind tibiae (Figs. 1g, h) with two broad terminal comb scales, both with a short spur. Front tarsi both lost, mLR 0.59, hLR 0.73, mBR 1.9, hBR3.1.

Hypopygium in Fig. 1 i. Two spermathecae (Sp. th) are present (also in Fig. 1 j), which are the female organs, but the terminal structure is typical as that of a male of *Chironomus*. Anal point long, narrow and constricted in the middle. Bands of ninth tergite are separated. Dorsal appendage (Fig. 1 k, dorsal view) plate-like, inner margin slightly concave and lateral margin convex, apically rounded, not basally expanded, and with 10 setae arising from the basal and inner portion. Ventral appendage (Fig. 1 m) long, finger-like, with 12 recurved setae and 2 short caudally directed setae. Gonostylus narrow, widest at about basal 1/3, with rounded apex.

Remarks. This specimen is quite unusual in that the structure of antenna, coloration of abdomen, and the presence of two spermathecae represent that of a female, but the structure of hypopygium is typical as a male of the genus *Chironomus*. It belongs to the *nippodorsalis* group as a member of Japanese species of this genus in the structure of male hypopygium, since dorsal appendage is plate-like, but in *C. nippodorsalis* the dorsal appendage is expanded widely at base and forming a low basal plate bearing about 5 inner setae, while in the present species the base of dorsal appendage is not expanded and bears 10 setae on the main shaft itself, somewhat like that of *Microtendipes*.

7. *Chironomus simantobeceus* sp. nov. (Fig. 2)

A male was collected on April 25, 1998, by sweeping with insect net at the side of a stream on a hill near the mouth of Shimanto River. Holotype: No. 360: 01 (#1-1).

Male. BL 7.12mm., WL 3.04mm, WW/WL 0.29. Ground color of scutum, scutellum and

anterior 1/3 of postnotum white, scutal stripes uniformly brown, posterior 2/3 of postnotum dark brown, legs yellow, abdominal tergites (Fig. 2 m) quite characteristic in coloration, I, VII and VIII entirely pale, II to VI largely pale but each with a circular brown area in the middle portion. Frontal tubercles (Fig. 2 a) prominent, 48 microns long, 12 microns in diameter, and 32 microns apart from each other. Eyes bare, ER 0.15. Antenna with 13 flagellar segments, AR 3.11, AHR 0.63. P/H 1.29. SO 34: 34, CL 26 (both very many). Anteprenotum (Fig. 2 b) united in the middle, without setae. Distribution of setae on scutum and scutellum in Fig. 2 c; DM 17, DL 21; 21, PA 7:7, SC 34 (very many).

Wing bare, SQ 25, RR 0.40, VR 1.10, R/Cu 1.17. Tip of front tibia (Fig. 2 d) with a broad and rounded terminal scale. Tips of middle and hind tibiae (Figs. 2 e, f) with two comb scales, both with a short spur. fLR 1.49, mLR 0.63, hLR 0.75, fTR 0.29, fBR 3.2, mBR 3.8, hBR 3.9. Pulvilli well developed, brush-like.

Hypopygium in Fig. 2 g. Anal point (Fig. 2 h) stout, strongly bent ventrally and apically pointed. Dorsal appendage (Figs. 2 i, j) composed of a wide base bearing 4 inner setae, and a sickle-shaped bare distal horn. Vnetral appendage (Fig. 2 k) long, finger-like, and with 10 recurved setae and 3 short caudally directed setae in the apical portion. Gonostylus abruptly constricted at about middle.

Remarks. This specimen has external structures typical as a member of genus *Chironomus*, and belongs to the group with horn-like dorsal appendage, and morphologically most closely related to *C. okinawanus* Hasegawa et Sasa, 1987, in that gonostylus is abruptly narrowed in distal half, and abdominal tergites II to IV with a dark mark in the middle, but the latter differs from the present species in that the dark abdominal marks are wider and triangularly produced backwards. It differs from the known species of this group in that anal point is stout and apically pointed, and especially in the color pattern of abdominal tergites, largely yellow and II to IV with a circular dark spot in the center.

8. *Dicrotendipes nervosus* (Staeger, 1839)

Three males were collected. No. 358:10 (#2-3), 360:37 (#2-3-2), 361:08 (#4-5-9)

9. *Dicrotendipes pelochloris* (Kiffer, 1912)

Three males were collected. No. 358:14 (#2-7), 360:05 (#2-1), 360:38 (#2-7-2).

10. *Harnischia simantocedeia* sp. nov. (Fig. 3)

Two males were collected on April 25, 1998, at #3, Tombo Koen, by sweeping with insect net. Holotype: 358:28 (#3-2). Paratype: 358:29 (#3-3).

Male. BL 3.82, 3.96mm, WL 1.57, 1.50mm, WW/WL 0.34, 0.33. Ground color of scutum, scutellum and abdomen pale, stripes and postnotum brown, legs yellow. Head in Fig. 3 a. Frontal tubercles (also in Fig. 3 b) very large, 28 microns long and 12 microns wide, 23 microns apart from each other. ER 0.35, 0.37. Antenna with 11 flagellar segments, AR 2.05, 2.19, AHR 0.61, 0.62. Palp composed of 5 segments, the first segment with a long seta, P/H 1.03, 1.05. SO all 10, CL 12, 10. Anteprenotum (Fig. 3 c) separated in the middle, without lateral seta. Distribution of setae on scutum and scutellum in Fig. 3 d. DM 6,8. DL 12:14, 8:8, PA all 3, SC 6,6.

Wing (Fig. 3 e) bare, anal lobe nearly rectangular, SQ 13:12, 7:8. RR 0.21, 0.27, VR

1.21, 1.19, R/Cu 1.12, 1.09. Tip of front tibia (Fig. 3 f) with a broad and rounded scale. Tips of middle and hind tibiae (Figs. 3. g, h) with two comb scales, both with a short spur. fLR 1.82, 1.95, mLR 0.53, 0.52, hLR 0.64, 0.66, fTR 0.27, 0.29, fBR 2.0, 1.8, mBR 2.6, 2.7, hBR 3.1, 3.6. Pulvilli large, pad-like (Fig. 3 i, hind tarsus V).

Hypopygium in Fig. 3 j. Anal point (also in fig. 3 k, ventral view) stout and apically rounded, with a low and broad process on ventral side. Dorsal appendage (also in Fig. 3 k) very small, finger-like, and with one terminal seta. Ventral appendage absent. Gonostylus slender and fused with gonocoxite, inner margin slightly concave.

Remarks. These two specimens are considered as belonging to a species of the genus *Harnischia* Kieffer, 1921, since their general structure is typical as a member of the *Chironomus* complex of the tribe Chironomini, but ventral appendage is absent and dorsal appendage is highly reduced. They seem to be most closely related to *H. curtilamellata* (Malloch, 1915) in body coloration, in that gonostylus is slender and slightly curved, and frontal tubercles and dorsal appendage are present. However, they differ from *H. curtilamellata* and other previously known species of this genus in that anal point is very stout (all the previously known species of this genus have narrow, either parallelsided or medially constricted anal point).

11. *Paracladopelma simantodeea* sp. nov. (Fig. 4)

A male was collected at #4, with a light trap in the town of Nakamura, on April 26, 1998. Holotype: No. 358:43.

Male, BL 3.30mm, WL 1.54mm, WW/WL 0.29. body largely yellow, only scutal stripes and postnotum brownish yellow. Head in Fig. 4 a. Frontal tubercles very small, semicircular, 4 microns wide, 2 microns high, and 13 microns apart from each other. Eyes bare, ER 0.20. Antenna with 11 flagellar segments, AR 1.63, AHR 0.63. Palp long, P/H 1.29, SO 156:15, CL 10. Anteprepronotum (Fig. 4 b) united in the middle, with 10:11 (very many) lateral setae. Distribution of setae on scutum and scutellum in Fig. 4 c. DM 12, DL 16: 19, PA 4:4, SC 16.

Wing membrane bare, plain, only veins R, R1 and R4+5 with numerous macrotrichia, venation in Fig. 4 d. Squama with 12:12 fringe hairs. RR 0.38, VR 1.26, R/Cu 1.10. Terminal scale of front tibia (Fig. 4 e) broad and with rounded margin. Terminal scales of middle and hind tibiae (Figs. 4 f, g) both with a short spur. Front tarsi both lost, mLR 0.57, hLR 0.64, mBR 3.7, hBR 4.3. Pulvilli well developed, brush-like.

Hypopygium in Fig. 4 h. Anal point (also in Fig. 4 i, dorsal view) narrow, constricted in the middle portion and slightly expanded distally, with rounded apex. Ninth tergite with 14 short setae around the base of anal point. Dorsal appendage (Fig. 4 j) quadrangular, slightly expanded near apex, with microtrichia on inner half, lateral half bare, and with a longer (28 microns) and a shorter (12 microns) setae. Ventral appendage (also in Fig. 4 j, ventral view) broad and with rounded margin. Gonostylus long, narrow, inner margin concave, and tapering towards pointed apex, with an apical seta and 5 short setae along inner margin.

Remarks. This specimen is considered as belonging to the genus *Paracladopelma* Harnisch, 1923, of the *Harnischia* complex of the tribe Chironomini, since dorsal appendage is

a short, broad pubescent pad bearing only one marginal seta, and ventral appendage is also a broad pubescent pad but without setae. It is most closely related to *P. camptolabis* (Kieffer, 1913) among the species recorded from Europe, in that anal point is constricted in the middle portion and apically expanded, and ventral appendage is broad and rounded, but differs remarkably in the shape of dorsal appendage, which is almost quadrangular and not strongly expanded, and bearing only one marginal seta (with a narrow a base and storngly expanded apically, and bearing several marginal setae in *camptolabis*). According to the list and key to Japanese Chironomidae compiled by Sasa (1998), a total of 11 species were recorded from Japan as members of this genus, among which only *P. camptolabis* is in common with Europe and the rest 10 species are apparently indigenus to Japan. The present species is most closely related to *P. nudiappendiculata* Kawai, 1991, in that dorsal appendage is not distally expanded or thumb-like but nearly quadrangular and lateral half is bare, and ventral appendage is small pubescent pad without setae, but it differs from the present species in that AR is 1.35 and smaller, PN is 6 and SQ is 3 and both smaller, anal point is parallel-sided and not constricted in the middle, dorsal appendage is differently shaped, and gonostylus is straight and parallel-sided.

***Tosayusurika* gen. nov.**

A new genus established with *simantoefea*, sp. nov. as the monotypic species. It belongs to the *Polypedilum* complex of the tribe Chironomini, subfamily Chironominae. Antenna composed of 13 flagellar segments, last segment very short, and the preceding segments bear only a few short flagella, and thus looks like that of a female. Squama is bare. Ninth tergite with 3 peculiar processes along the midline, dorsal appendage of gonocoxite is pad-like, and the ventral appendage is long, curved and with some 8 short recurved setae arising from the apical portion. This genus is considered as belonging to the *Polypedilum* complex of the tribe Chironomini, since antenna with 13 flagellar segments and one comb of middle and posterior tibiae with a spur, and the other comb without spur. Only a few genera of this complex has a bare squama, among which the present genus is somewhat related to *Pagastiella* Brundinn in that wings are unmarked, gonostylus is about twice as long as gonocoxite, but in this genus antenna and anal point are the normal type while the present genus has quite unusual structures in male antenna and in that ninth tergite bears 3 different anal points. "Tosa" is the old name of Kochi Prefecture, and "yusurika" is a Japanese name of the chironomid midges.

12. *Tosayusurika simantoefea*, gen. et sp. nov. (Fig. 5)

Fourteen (14) males were collected on April 26, 1998, 13 with a light trap in the town of Nakamura near the mouth of Shimanto River, another by sweeping with insect net at the side of Hiromi branch River. Holotype: No. 358:45 (#4-5). Paratypes: No. 359:51-54, 360:43 (#4-5-2), 361:01-07, 358: 24 (#7-3).

Male. BL 4.38, 4.14, 3.72mm, WL2.02, 1.82, 1.58mm, WW/WL 0.35, 0.35, 0.38 (very wide). Body largely white and slightly yellowish, only scutal stripes and postnotum brownish yellow. Head in Fig. 5 a. Frontal tubercles absent. Eyes bare, ER 0.08, 0.13, 0.15. Antenna quite unusual in the structure, with 13 flagellar segments but the last segment is very short

and with narrow distal portion (Fig. 5 b, enlarged view of the last 3 antennal segments), each segment with only a few long setae and somewhat looks like a female antenna, AR 0.23, 0.24, 0.28, AHR 0.21, 0.18, 0.20. Palp short, P/H 0.96, 0.88, 0.93. SO 12:12, 12:13, 8:10, CL 24, 20, 23. Anteprenotum (Fig. 5 c) widely separated and without lateral setae. Distribution of setae on scutum and scutellum in Fig. 5 d, DM 14, 16, 12, DL 12:12,, 13:13, 8:10, PA 4:3, 3:4, 3:3, SC only 2 in all of the 3 specimens.

Wing bare, finely granular and bluish, very wide, venation in Fig. 5 e. Squama bare. RR 0.49, 0.48, 0.48, VR 1.34, 1.39, 1.36, R/Cu 1.18, 1.16, 1.17. Tip of front tibia (Fig. 5 f) with a long, narrow and sharply pointed terminal scale, tip of middle tibia (Fig. 5 g) with two separated comb scales, one with a spur and the other without spur, while terminal scales of hind tibia (Fig. 5 h) both with a spur, all quite unusual structure as a member of Chironomini. fLR 1.52, 1.50, 1.39, mLR 0.62, 0.61, 0.62, hLR 0.65, 0.58, 0.59, fTR 0.23, 0.27, 0.21, fBR 1.6, 1.6, mBR 3.1, 3.8, hBR 3.3, 4.9 Tarsi V with an empodium, a pair of simple claws and brush-like pulvilli (Fig. 5 i, hind tarsus V).

Hypopygium in Fig. 5 j (holotype). Ninth tergite with 3 processes on midline, the basal one bilobed and with some 30 strong setae, the middle one oval and with some 12 simple marginal setae, and the distal one broad and rounded, also with 12 marginal setae (see Fig. 5 k). Gonocoxite with a dorsal and a ventral appendage, the former broad, pad-like and clothed with microtrichia and with marginal setae (5 in the holotype, only 1 in the paratype), but looks thumb-like according to the angle of observation, such as in the right side dorsal appendage in Fig. 5 j. Ventral appendage very long, curved, and with 10–12 setae arising from the apical portion. Gonostylus very long and slender, inner margin slightly concave and apically pointed.

Remarks. This species obviously belongs to the tribe Chironomini in the basic structures, and to the *Polypedilum* complex since antenna composed of 13 flagellar segments, but is quite unusual in that last antennal segment is very short and hairs on the preceding segments are very few and short, and thus it looks like that of a female, ninth tergite has 3 different lobes of peculiar structures along the midline; the structures of dorsal and ventral appendages of gonocoxite are also quite characteristic in structure, and thus recorded as a new species of a new genus.

13. *Microtendipes simantofegeus* sp. nov. (Fig. 6)

A male was collected with a light trap on April 26, 1998, in the town of Nakamura. Holotype: No. 358:47 (#4–7).

Male. BL 5.06mm, WL 2.64mm, WW/WL 0.30. Ground color of scutum pale, median stripes almost evenly yellow, lateral stripes are dark brown along the midline and brownish yellow in the median and lateral areas (Fig. 5 c). Postnotum dark brown, abdomen pale, hypopygium brown. Leg segments largely pale but all femora with a narrow apical brown ring, and all tibiae with narrow brown rings in the basal and apical portions. Wing with a faint transverse dark band in the middle portion when observed by reflecting light.

Head in Fig. 5 a. Eyes bare, ER 0.27. Antenna with 13 flagellar segments, AR 0.97, AHR 0.52. Palp long. P/H 1.65. SO 22:22 (very many) roughly in two rows, CL 18. An-

tepronotum (Fig. 5 b) slightly separated in the middle, with 8:8 lateral setae (much larger than in the other two species). Distribution of setae on scutum and scutellum in Fig. 5 c; DM 8, DL 17:19, PA 4:4, SC 24.

Wing bare, squama with 24:24 fringe hairs, venation in Fig. 5 d. R2+3 in contact with R1. VR 1.15, R/Cu 1.13. Terminal scale of front tibia (Fig. 5 e) low, broad and rounded. One terminal comb scale of middle and hind tibiae with a spur, the other comb without spur (Figs. 5 f, g). fLR 1.30, mLR 0.69, hLR 0.76, fTR 0.17, fBR 4.1, mBR 3.8, hBR 6.1. All legs with two simple claws, an empodium, and two pad-like pulvilli (Fig. 5 h, hind tarsus V).

Hypopygium in Fig. 5 i. Anal point (also in Fig. 5 j) long, narrow, nearly parallel-sided and apically rounded. Bands of ninth tergite separated, ninth tergite with 12 long setae arising from the median portion, and another 12 short setae on posterior margin. Dorsal appendage (Fig. 5 k) sickle-shaped, inner margin concave and nearly rectangularly curved in the middle, with 2 basal setae 6 dorsal setae and microtrichia in the middle portion. Ventral appendage (Fig. 5 m) finger-like, slightly tapered towards apex, with 24 recurved setae and 2 long caudally directed setae. Gonostylus stout, widest at about basal 1/3, inner margin almost straight.

Remarks. This specimen is a typical member of genus *Microtendipes* in the basic structure, and especially characteristic in the body coloration (scutal stripes are not uniform in color, and femora and tibiae with dark rings). and in the structure of dorsal appendage. It is somewhat related to *M. kamoprimum* Sasa, 1989, in that anal point is narrow and parallel-sided, scutal stripes are not uniform in color, and dorsal appendage is sickle-shaped, but in *M. kamoprimum* AR is 2.47 and much higher, median stripes are two colored and lateral stripes are unicolorous, dorsal appendage is narrower and the mode of distribution of setae are quite different (with 3 lateral and 3 inner setae), and wing a transverse cloudy band, not longitudinal cloudy areas such as in the present species. The present species has as many as 8 lateral setae on anteppronotum (3, 4 or 1 in the other two species of the present collections), and scutal stripes and legs are unicolorous in the other two species.

14. *Microtendipes simantogeheus* sp. nov. (Fig. 7)

A male was collected on April 24, 1998, with a light trap at St. #4, in the town of Nakamura. Holotype: No. 358:53 (#4-13).

Male. BL 5.06mm, WL 2.64mm, WW/WL 0.26. Ground color of scutum, and scutellum yellow, stripes and postnotum almost uniformly brown, legs and abdomen uniformly yellow. Wing with a faint dark transverse band in the area surrounding cross vein R-M, which is not so conspicuous as in the former species. Head in Fig. 7 a. Eyes bare, ER 0.24. Antenna with 13 flagellar segments, AR 2.02, AHR 0.57. Palp very long, P/H 1.73. SO 10:10, CL 24. Anteppronotum (Fig. 7 b) widely separated, with 4:3 lateral setae. Distribution of setae on scutum and scutellum in Fig. 7 c; DM 4, DL 13:13, PA 4:4, SC 22 in two transverse rows.

Wing (Fig. 7 d) bare, SQ 14:15. R2+3 in contact with R1, VR 1.15, R/Cu 1.14. Terminal scale of front tibia (Fig. e) broad and rounded. One terminal comb scale of middle and hind tibiae with a long spur, the other comb without spur, like in the former species (Figs. 7 f, g). fLR 1.28 (smaller), mLR 0.70, hLR 0.76, fTR 0.24, fBR 3.2, mBR 3.9, hBR 4.2. All

legs with a pair of large pad-like pulvilli (Fig. 7 h).

Hypopygium in Fig. 7 i. Anal point (also Fig. 7 j) long, narrow and apically rounded. Dorsal appendages (Fig. 7 k) sickle-shaped and without basal tubercle, with 2 basal and 6 dorsal setae. Ventral appendage (Fig. 7 m) not apically expanded, with 24 recurved setae arising from the apical portion. Gonostylus rather slender, inner margin slightly concave.

Remarks. This specimens is also a member of the genus *Microtendipes* in the structure of wing veins (especially R2+3 is in contact with R1), in the terminal structure of tibiae, and structure of hypopygium, especially the shape of dorsal appendage being sickle-like and with several setae. However, it differs from the former species, *M. simantoefeus*, in that AR is much larger (2.02 versus 0.97), wing is much narrower (WW/WL 0.26 versus 0.30), scutal stripes are uniformly brown, the numbers of DM and DL are fewer, and ventral appendage is longer, narrower and with recurved setae arising only from the distal portion. Since no species with the above combination of structures is found among the previously recorded ones of this genus, its described here a new species.

15. *Microtendipes truncatus* Kawai et Sasa, 1985 (Fig. 8)

Nine males were collected on April 26, 1998, 2 with a light trap in the town of Nakamura another by sweeping at the side of Hiromi River. No. 358:54 (#4-14), No. 358:55 (#4-15), No. 358-91 (#7-10), 359:58, 59 (4-15-9, 10), 361:12-14 (#4-15-5-8).

Male. BL 3.54, 3.66, 3.74mm, WL 1.88, 1.96, 1.88mm, WW/WL 0.30, 0.31, 0.31. Body almost entirely white, even scutal stripes and postnotum are hardly discernible by color. Wing without transverse cloudy band such as seen in the other two species of this genus. Head in Fig. 8 a. ER 0.31, 0.51, 0.33, AR 1.44, 1.40, 1.45, AHR 0.54, 0.54, 0.53, P/H 1.43, 1.33, 1.44. SO 8:8, 10:10, 10:10, CL 16, 16, 14. Anteprepronotum (Fig. 8 b) tapering towards middle and widely separated, lateral seta all 1:1. Distribution of setae on scutum and scutellum in Fig. 8 c; DM all 2, situated at the anterior apex of median stripes; DL 5:5, 6:6, 6:6, PA 2, 4, 6, SC 2, 4, 6.

Wing (Fig. 8 d) bare, venation typical as a member *Microtendipes*. SQ 6:6, 4:4, 6:6. R 2+3 in contact with R1. VR 1.15, 1.20, 1.23, R/Cu 1.14, 1.13, 1.11. Terminal structure of tibiae as in other species of this genus (Figs. 7 e, f, g). fLR 1.55, 1.48, 1.43 (higher than in the former species of this genus), mLR 0.71, 0.70, 0.70, hLR 0.83, 0.81, 0.86, fTR 0.24, 0.24, 0.21, fBR 3.5, 3.3, 2.8, mBR 5.5, 4.8, 4.7, hBR 4.7, 5.7, 5.3. Tarsi V with an empodium, 2 claws, and two rather small, brush-like pulvilli (Fig. 8 h, hind tarsus V).

Hypopygium in Figs. 8 i, j. Anal point long, narrow, nearly parallel-sided and with rounded apex. Bands of ninth tergite separated. Dorsal appendage (Fig. 8 j, left and right, ventral view) relatively wide and sickle-shaped, with a prominent basal tubercle bearing a strong seta, and 3 relatively short setae on lateral margin, quite characteristic to this species. Ventral appendage (Fig. 8 j, right) tapering towards apex, with some 20 recurved setae. Gonostylus rather slender, widest at about middle and inner margin slightly concave.

Remarks. The above measurement data and structure of the present specimens are almost coincident with that *M. truncatus* Kawai et Sasa, 1985, recorded first form Ohta River, Hiroshima. It is especially characteristic in the body coloration being almost entirely pale an

even scutal stripes and postnotum are hardly discernible by color, and also in the structure of dorsal appendage, which has a prominent tubercle bearing one strong seta at the basal and inner portion, AR is 1.40–1.45 and intermediate between the other two species of this genus, while fLR is 1.43–1.55 and hLR is 0.81–0.86 and probably significantly higher than in the other two species.

16. *Polypedilum (Polypedilum) asakawaense* Sasa, 1980

Seven males were collected at #10, Hiromi, with a light trap. No. 359:24 (#10–6).

17. *Polypedilum (Polypedilum) benokiense* Sasa et Hasegawa, 1988

Three males were collected. No. 358:60 (#4–20), 358:65 (#5–1). 358:96 (#8–3). BL 3.48 3.28 3.26 mm, WL 1.52, 1.72, 1.68mm, WW/WL 0.32, 0.34, 0.35. ER 0.21, 0.18, 0.17 AR 0.62, 0.66, AHR 0.47, 0.44. P-H1.02, 1.17, 1.00. SO 12:12, 10:10, 10:11. CL 16, 16, 21. PN all 0. DM 18, 18, 23, DL 10:10, 17:18, 26:28, PA 4:5, 4:5, 5.6, SC 8, 8, 10. SQ 9:10, 16:16, 20:20. R2+3 in contact with R1. VR 1.18, 1.30, 1.31, R/Cu1.17, 1.16, 1.14. fLR 1.73, 1.72, mLR 0.63, 0.56, 0.53, hLR 0.82, 0.70, 0.69, fTR 0.29, 0.27, fBR 5.1, 3.8, mBR 7.4, 6.2, 4.0, hBR 5.3, 6.7, 4.8.

This species is a member of the *nubeculosum* group of the genus *Polypedilum*, subgenus *Polypedilum*, and was first recorded from Okinawa, later also from a number of localities in Honshu (Sasa & Kikuchi, 1995, p.37)

18. *Polypedilum (Polypedilum) nubifer* (Skuze, 1889)

Forty three (43) males were collected at #10, Hiromi, with a light trap. No. 359:25 (#10–7) is confirmed as a slide mounted specimen.

19. *Polypedilum (Polypedilum) simantoheium* sp. nov. (Fig. 9)

A male was collected on April 25, 1998, by sweeping at the side of Shimanto River near its mouth, in Nakamura. Holotype: No. 358:03 (#1–3).

Male. BL 3.18mm, WL 1.66mm, WW/WL 0.33. Scutal stripes almost evenly dark brown but scutum with a pair of large pale areas lateral to the lateral stripes, scutellum brown, postnotum dark brown, abdomen almost uniformly brown, leg segments brownish yellow. Most of the principal setae are unusually long in the present species. Head in Fig. 9 a. Eyes bare, ER 0.22. Frontal area is damaged and lost. Antenna with 13 flagellar segments, AR 0.67, AHR 0.36. P/H 1.02. SO 11: 12, CL 16. Anteprepronotum (Fig. 9 b) widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 9 c; DM 22, DL 24:24, PA 4:5, SC 12, all very long.

Wing (Fig. 9 d) bare without dark marks. SQ 12, anal lobe obtuse. R2+3 in contact with R1, VR 1.31, R/Cu 1.15. Tip of front tibia (Fig. 9 i) with a narrow and apically pointed terminal spur. Tips of middle and hind tibiae (Figs. 9 f, g) with two comb scales, one with a spur and the other without spur. fLR 1.68, mLR 0.54, hLR 0.71, fTR 0.27, fBR 3.4, mBR 4.5, hBR 7.7. Legs with a pair of large brush-like pulvilli.

Hypopygium in Fig. 9 h. Anal point (also in Fig. 9 e) long, narrow, and tapering towards pointed apex. Anal tergite with very long setae on the base of anal point, which extend much beyond tip of anal point. Dorsal appendage (Fig. 9 j) widest at base, smoothly curved and tapering towards pointed apex, with 3 basal setae but without lateral seta. Ventral

appendage (Fig. 9 k) finger-like, with 8 very long recurve setae (mostly as long as or longer than the ventral appendage) and also a very long, caudally directed seta. Gonostylus (Fig. 9 m) widest at about middle, inner margin nearly straight, with a long apical seta, and 4 very long and 6 shorter setae on inner margin.

Remarks. This specimen belongs to the *nubifer* group of the subgenus *Polypedilum*, since dorsal appendage without long lateral seta, and is somewhat related to *P. toganudum* Sasa et Okazawa, 1991, in that antep pronotum without lateral setae, wing without dark marks, dorsal appendage with basal inner setae, and gonostylus with a longitudinal keel. However, *P. toganudum* differs from the present species in that AR is 0.81–0.85 and larger, the numbers of scutal setae are DM 34–44, DL 35–54, PA 10–15, SC 29–49, and all larger in the numbers but much shorter in the length than in the present species, anal point is nearly parallel-sided and apically rounded, and dorsal appendage is more strongly curved and apically hooked (apically pointed and not hooked in the present species).

20. *Polypedilum (Polypedilum) simantoijeum* sp. nov. (Fig. 10)

A male was collected with a light trap at Hiromi on April 27, 1988. Holotype: No. 359:23 (#10–5).

Male. BL 5.30mm, WL 2.78mm, WW/WL 0.30. Scutum, scutellum and abdomen largely dark brown, leg segments almost evenly yellow, excepting coxae and trochanters which are dark brown. Head in Fig. 10 a. Eyes bare, ER 0.26. Frontal tubercles absent. Antenna with 13 flagellar segments, AR 0.92, AHR 0.41. P/H 1.09. SO 23:24, CL 34, both very many. Antep pronotum (Fig. 10 b) widely separated, without setae. DM 41, DL 55:64, PA 15:15, SC 46, all very many.

Wing (Fig. 10 d) bare, without dark marks, squama with 32 fringe hairs. R2+3 almost in contact with R1, RR 0.17. VR 1.33, R/Cu 1.44. Tip of front tibia (Fig. 10 e) with a narrow and pointed terminal process. Tips of middle and hind tibiae (Figs. f, g) with two comb scales, one with a long spur, other without spur. fLR 1.60, mLR 0.55, fTR 0.30, fBR 4.1, mBR 3.9 (hind tarsi lost). Pulvilli well developed, pad-like and with numerous short setae.

Hypopygium in Fig. 10 h. Anal point long, narrow and almost parallel-sided, with lateral ridges. Bands of ninth tergite separated, ninth tergite with 25 setae around base of anal point, the tip of the anterior setae reaching to only the base of anal point, shorter than in the former species. Dorsal appendage (Fig. 10 i) composed of a wide base bearing 3 inner setae and microtrichia, and a distal horn slightly curved and tapering, apex slightly hooked and rounded. Ventral appendage with a long terminal seta, and 16 recurved setae which are about 1/3 to 1/2 as long as the shaft of ventral appendage. Gonostylus long, narrow, widest at about basal 1/3, with 6 long and 6 short setae on inner margin but without apical seta.

Remarks. This species is also a typical member of the *nubifer* group of subgenus *Polypedilum*, since dorsal appendage is horn-like and without lateral seta. It is somewhat related to *P. medivittatum* (Tokunaga, 1964) in that antep pronotum without setae, dorsal appendage with inner setae and microtrichia on the basal portion, gonostylus without longitudinal keel, and dorsal appendage only slightly curved and apically hooked, but *P. medivittatum* differs from the present species in that AR is 2.07 and much larger, DM 16, DL

14:15, PA 5, SC 8 and all much smaller in the numbers according to Sasa & Hasegawa, 1983. This species is also closely related to the former, *P. simantoheium*, but body size is much larger, AR is larger (0.92 in the present, 0.67 in the former species), the numbers of setae on scutum and scutellum are much larger, anal point is parallel-sided and apically rounded (tapering towards pointed apex in the former), setae on ninth tergite are shorter and reach only to the base of anal point (much longer and extending beyond tip of anal point in the former), dorsal appendage with much broader base and its distal horn is broader and apically rounded and slightly hooked (the base is narrower, only slightly expanded, distal horn more strongly curved and tapering towards pointed apex in the former), recurved setae on ventral appendage is shorter and only about 1/3 the length of ventral appendage (these setae are mostly as long as or longer than the length of ventral appendage in the former), gonostylus without longitudinal keel and without long apical seta.

21. *Polypedilum (Polypedilum) simantomaculatum* sp. nov. (Fig. 11)

Two males were collected on April 26, 1998. Holotype: No. 360:21 (#6-1), collected at Ekawasaki. Paratype: 358:48 (#4-8), collected with a light trap at Nakamura Town.

Male. BL 5.04, 5.96mm WL 2.28, 2.72mm, WW/WL 0.32, 0.32. Body largely yellow and with quite peculiar brown marks; ground color of scutum, and scutellum yellow, lateral stripes with an anterior and a posterior dark spots, as in Fig. 11 c, postnotum dark brown, abdomen largely yellow but tergites II to VI with a faint brown area in the middle. Leg segments also with peculiar dark marks (Fig. 11 e); coxae and trochanters of all legs largely brown, femora all with 3 brown bands, which are all short in the fore leg but the first brown band is very long in the middle and hind femora; tibiae with a median and an apical brown ring, the former is very short in the front tibia but is about half of the segment in middle tibia and 2/3 of the segment in hind tibia; front tarsi all lost; middle tarsi all yellow, but hind tarsus I with a basal and an apical brown ring, II to V yellow.

Head in Fig 11 a. Eyes bare, ER 0.22 0.39. Frontal tubercles absent. Antenna with 13 flagellar segments, AR 1.61, 1.88, AHR 0.58, 0.56, P/H 1.28, 1.25. SO all 18, CL 26, 28. Anteprenotum (Fig 11b) widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 11c; DM 20, 18, DL 24:24, 20:20, PA 4:4, 6:6, SC 28,34.

Wing (Fig. 11d) largely dark blue and with pale marks. SQ 10:12, 24:24, R2+3 separated, RR 0.43, 0.46. VR 1.09, 1.13, R/Cu 1.18, 1.18. Distribution of dark areas on legs in Fig. 11e. Tip of front tibia (Fig. 11f) with a broad and rounded terminal scale. Terminal comb scales of middle and hind tibiae (Figs. 11g, h) contiguous and with one spur. Tarsi of front legs all lost, mLR 0.68, hLR 0.86, 0.86, mBR 0.59, hBR 5.3, 5.9. Pulvilli well developed, brush-like.

Hypopygium in Fig. 11 i. Anal point long and narrow, parallel-sided and with rounded apex. Dorsal appendage (Figs. 11j, k) narrow and horn-like, not basally expanded and with 2 inner setae, without lateral seta. Ventral appendage (Fig. 11m) long, and narrow, with a long apical seta, and 16 recurved setae. Gonostylus short, about half the length of gonocoxite, and abruptly constricted at about middle.

Remarks. These specimens belong to the *nubifer* group of genus *Polypedilum* in basic

structure, but are quite unusual in that wing membrane is largely blue and with white spots, body with peculiar complicated dark marks, dorsal appendage is small but ventral appendage is extremely long and narrow, and we could not find any related species within this group.

22. *Polypedilum (Polypedilum) tamanigrum* Sasa, 1983

Two males were collected. No 360: 68 (#8-3-2), 360:69 (#8-3-3). BL 3.54, 2.98mm, WL 1.76, 1.74mm WW/WL 0.34, 0.32. Scutum and postnotum dark brown, scutellum and abdomen brown, legs yellow. ER 0.19, 0.21. AR 1.02, 0.98, AHR 0.47, 0.50, P/H 1.10, 1.09, SO all 12, CL 12, 14. Anteprenotum widely apart, without lateral setae. DM 18, 14, DL 15:17, 13:14, PA 5:6, 5:5, SC 14,15, SQ 8:8, 9:10. R2+3 in contact with R1, VR 1.31, 1.26, R/Cu 1.18, 1.16. fLR 1.87, 1.75, mLR0. 54, 0.53, hLR0.69, 0.71, fTR 0.29, 0.28, fBR 4.0,3.0, mBR 6.3, 5.1, hBR 6.9, 5.7. Anal point long, slender and apically pointed. Dorsal appendage with a triangular base bearing 2 long inner setae, the distal horn very long, slender, nearly straight and slightly hooked apically, with lateral seta arising at about distal 1/3.

Remarks. These specimens belong to the *nubeculosum* group of the genus *Polypedilum*, and the above measurement data and structure are almost coincident with those of *P. tamanigrum* Sasa, 1983.

23. *Polypedilum (Tripodura) japonicum* (Tokunaga, 1938)

A male was collected. No. 359:29 (#10-11).

24. *Polypedilum (Tripodura) unifascium* (Tokunaga, 1938)

Eleven (11) males were collected. No. 358:50 (#4-10), 358:86 (#7-5), 359:30 (#10-12), 360: 45 (#4-10-2), 359:55-57 (#4-10-6-8), 361:09-11 (#4-10-3-5), 361:33 (#4-12-2,3).

25. *Polypedilum (Uresipedilum) cultellatum* Goetghebuer, 1931

A male was collected. No. 359:32 (#10-4).

26. *Polypedilum (Uresipedilum) surugense* Niitsuma, 1991

A male was collected. No. 360:97 (#10-15-7).

27. *Polypedilum (Uresipedilum) simantokeleum* sp. nov. (Fig. 12)

A male was collected with a light trap in the town of Nakamura on April 26, 1998. Holotype: No. 360:50 (#4-15-4).

Male. BL 3.64mm, WL2.00mm, WW/WL 0.30. Body almost entirely pale, even scutal stripes and postnotum hardly discernible by color. Head in Fig. 12 a Eyes bare, ER 0.30. Frontal tubercles absent. Antenna with 13 flagellar segments, AR 1.75, AHR 0.56. P/H 1.23. SO 10:10, CL 13. Anteprenotum (Fig. 12 b) tapering towards middle and widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 12 c; DM 16, DL 12:12, PA 4:4, SC 18 in two transverse rows.

Wing (Fig. 12 d) bare, SQ 11:12, R2+3 in contact with R1, VR 1.20, R/Cu 1.14. Tip of front tibia (Fig. 12 e) with broad and rounded terminal scale. Tips of middle and hind tibiae (Figs 12 f, g) with two scales, one with a long spur and the other without spur. Front tarsi both lost, mLR 0.59, hLR 0.77, fmR 5.0, hBR 8.1, Pulvilli large, brush-like.

Hypopygium in Fig. 12 h. Posterior margin of ninth tergite medially flat. Ninth tergite with 12 long setae in the middle portion and with 10 short setae on both sides of the base of

anal point. Bands of ninth tergite separated in the middle. Anal point (Fig. 12 i) long, slender, parallel-sided and apically rounded. Dorsal appendage (Figs. 12 j, k) composed of a broad base and sickle-shaped inner process, the former not produced backwards like in *P. convictum* and with one long seta on posterior margin and a prominent basal process bearing 10 strong setae. Ventral appendage (Fig. 12 m) distally expanded and with one very long caudally directed terminal seta and 20 short recurved setae arising in the distal portion. Gonostylus long, slender and widest at about middle and bearing 10 long setae in two rows on the inner margin.

Remarks. This specimen belongs to the subgenus *Uresipedium* of the genus *Polypedilum*, and is similar in body coloration and in the structure of dorsal appendage to *P. convictum* (Walker, 1856), but differs from it in that dorsal appendage with a prominent basal process bearing many strong setae and its posterior margin is not produced caudally (such a process is absent and its posterior margin is produced backwards in *P. convictum*), ventral appendage is expanded distally (tapering towards apex in *P. convictum*), and posterior margin of ninth tergite is horizontally straight (rounded in *P. convictum*), ninth tergite with a group of strong setae flanking the base of anal point (such setae are absent in *P. convictum*).

28. *Cladotanytarsus simantolemeus* sp. nov. (Fig. 13)

Twenty eight (28) males were collected at the side of Hiromi River, 4 at #9 with insect net on April 26, and another 4 at #10 on April 27 with a light trap. Holotype: 359:10 (#9-6). Paratypes: 359:35 (#10-19), 359:37 (#10-19), 359:38 (#10-20), 359:68-79 (9-6-11 to 22), 361:23-30 (#9-6-3 to 10), 360:76 (#9-6-2), 360:77 (#9-7-2), 360:78 (9-7-3), 360:98 (#10-19-2).

Male. BL 1.84-2.08 (1.95 in average of 8) mm., WL 1.06-1.24 (1.13) mm, WW/WL 0.33-0.35 (0.34, very wide). Body largely pale yellow, scutal stripes and postnotum brown. Head in 13 a. Frontal tubercles absent, but frons composed of a pair of large conical processes medially touching each other. Eyes bare, reinform, inner margin concave, ER 1.50-1.56 (very widely apart). Antenna composed of 10 flagellar segments in all the 4 specimens, AR 0.67-0.84 (0.77), AHR 0.38-0.45 (0.42). Anteprenotum (Fig. 13 b) tapering towards middle and widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 13 c; DM 9-12 (10.8), DL 6-8 (7.5), PA all 1, SC 4-6 (4.5).

Wing (Fig. 13 d) with macrotrichia only in the extreme tip region and on veins R and on distal half of R4+5, squama bare, vein R2+3 is obscure, VR 1.27-1.33 (1.31), R/Cu 1.00-1.04 (1.02). Tip of front tibia (Fig. 13 e) with a long and narrow terminal process, tips of middle and hind tibiae (Figs. 13 f, g) with two relatively narrow comb scales, both with a spur. fLR 1.68, 1.71, mLR 0.45-0.49 (tarsi I of middle legs very short), hLR 0.55-0.58 (0.56), fTR both 0.29, fBR 3.2, 4.9, mBR 3.6-6.6 (4.8), hLR 4.3-6.1 (5.5). Pulvilli absent.

Hypopygium in Fig. 13 h. Anal point (Fig. 13 i) widest at base, distal process abruptly constricted and apically pointed, without lateral ridges and with numerous small spines. Dorsal appendage (Fig. 13 j) narrow and sickle-shaped, with a digitus-like basal bearing 2 or 3 terminal setae. Median appendage (Fig. 13 k) relatively short and with short simple setae on

distal half. Ventral appendage (Fig. 13 m) finger-like and slightly expanded apically, with 7 or 8 short recurved setae and 2 or 3 caudally directed short setae arising from the distal portion. Gonostylus widest at about basal 1/3, apically pointed, and with short setae in two rows along inner margin.

Remarks. This species is provisionally classified into the genus *Cladotanytarsus* Kieffer, 1922, since wing with macrotrichia only in the extreme tip region, dorsal appendage sickle-shaped, and anal point without lateral ridges and with numerous spines. However, it is quite unusual as a member of this genus in that median appendage is very short, directed inwards and much shorter than the ventral appendage, and dorsal appendage with digitus-like basal process bearing 2 or 3 apical setae (digitus of previously known species of this genus bears no apical setae). If this species is considered as devoid of digitus, then it is somewhat related to the genus *Stempellinella* Brudinn, 1947, in that R/Cu is about 1.0, but it is again unusual in that dorsal appendage has a digitus-like process bearing 2 or 3 terminal setae.

29. *Cladotanytarsus simantomeneus* sp. nov. (Fig. 14)

A male was collected by sweeping at #9, on the shore of Hiromi River, Holotype: No. 359:11 (#9-7).

Male. BL 1.59mm, WL0.99mm (both smaller than in the preceding species), WW/WL 0.34. Body almost entirely pale yellow, only scutal stripes and postnotum brownish yellow. Head in Fig. 14 a. Frontal tubercles absent, frons conical and touching each other, like in the preceding species. Eyes bare, reniform, inner margin concave, ER 1.26. Antenna composed of 10 flagellar segments, AR 0.72, AHR 0.40. P/H 1.09. SO 8:8, CL 12. Anteprepronotum (Fig. 14 b) widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 14 c. DM 10, DL 6:6, PA 1:2, SC4.

Wing (Fig. 14 d) with macrotrichia only in the extreme tip area and on veins R, R4+5, and Cu2. R2+3 not discernible. Tip of R4+5 proximal to tip of Cul, R/Cu 0.93. VR 1.37 (very high). Squama bare, anal lobe nearly flat. Tip of front tibia (Fig. 13 e) with a very long, narrow and sharply pointed terminal process. Tips of middle and hind tibiae (Figs. 14 f, g) with two narrow comb scales, both with a long spur, fLR 1.70, mLR 0.45 (very low), hLR 0.61, fTR 0.30, fBR 2.6, mBR 3.2, hBR 3.3. Pulvilli absent.

Hypopygium in Fig. 14 h. Anal point very broad, low and rounded, without lateral ridges and without spine clusters. Enlarged dorsal view of dorsal (D), median (M) and ventral (V) appendages under natural position in Fig. 14 i, dorsal appendage (D) sickle-shaped, with a basal tubercle bearing only one seta, median appendage (M) short, directed inwards, and bearing many short simple setae, ventral appendage (V) long, finger-like and slightly expanded apically, with 8 short recurved setae and 3 caudally directed short setae arising in the apical portion.

Remarks. This specimen is quite similar in structure to the preceding species, especially in that wing with macrotrichia in only the extreme tip region, median appendage is much shorter than ventral appendage, and dorsal appendage with digitus-like basal process bearing terminal setae, and is also classified provisionally into the genus *Cladotanytarsus*. However, it differs from the preceding species in that tip of R4+6 is proximal to tip of Cul

($R/Cu < 1.0$), and thus closer to the genus *Stempellina* Thienemann et Bause, 1913. The present specimen differs also from *C. simantolemeus* in that anal point is very low, wide and rounded, BL, WL and ER are smaller.

30. *Micropsectra simantoneoa* sp. nov. (Fig. 15)

A male was collected with a light trap in the town of Nakamura on 26 April, 1988. No. 358:62 (#4-22).

Male. BL 1.88mm, WL 1.08mm, WW/WL 0.31. Ground color of scutum, and scutellum yellow, stripes and postnotum brown, abdomen yellowish brown, distal half of femora brownish yellow, other leg portions yellow. Head in Fig. 15 a. Frontal tubercles absent. Eyes pubescent, reniform and widely apart, ER 1.30. Antenna with only 10 flagellar segments, AR 0.41, AHR 0.27. Palp long, P/H 1:20. SO 3:3, CL 10. Anteprenotum (Fig. 15 b) tapering towards middle and widely apart, without seta. Distribution of setae on scutum and scutellum in Fig. 15 c; DM 11, DL 9:9, PA 1:1, SC only 2.

Wing (Fig. 15 d) widest near apex, squama bare, anal lobe nearly flat, and with macrotrichia more densely in the distal half. Venation quite peculiar. $R4+5$ ending much proximal to the tip of Cul, R/Cu 0.83; $R2+3$ obscure, almost in contact with $R4+5$. FCu much distal to R-M, VR 1.55 (very high), Cu2 very short. Tip of front tibia (Fig. 15 e) with a narrow and sharply pointed spur. Tips of middle and hind tibiae (Figs. 15 f, g) with two separated narrow comb scales, both without spur. fLR 1.90, mLR 0.50, hLR 0.75, fTR 0.21, fBR 3.0, mBR 3.3, hBR 3.8. Pulvilli absent.

Hypopygium in Figs. 15 h (dorsal), 15 i (ventral view). Bands of ninth tergite separated. Anal point (Fig. 15 j) widest at base and tapering towards rounded apex, with narrow anal crests, and bearing 6 basal and 6 lateral setae on both sides of the base. Dorsal appendage (Fig. 15 k) plate-like, with 3 inner and 2 lateral setae but without basal seta and basal process. Median appendage (Fig. 15 m) narrow, with a short shaft and long simple setae directed inwards. Ventral appendage (Fig. 15 m) long, finger-like but tapered towards apex, with 10 short recurved setae on distal 1/3. Gonostylus simple, narrow, inner margin slightly concave.

Remarks. This specimen is provisionally classified into the genus *Micropsectra* Kieffer, 1915, since wing with macrotrichia, squama bare, terminal combs of middle and hind tibiae are separated and without spur, anal point without wide cresta, median appendage bears only simple setae, dorsal appendage plate-like and bearing inner and lateral setae, and ventral appendage with simple recurved setae only. However, it is quite unusual as a member of the *Micropsectra-Paratanytarsus* group especially in that antenna with only 10 flagellar segments (with 13 flagellar segments in these genera according to Cranston *et al.* 1978, p. 389), eyes are reniform and pubescent (eyes with dorsomedial projection and never hairy), vein $R4+5$ ending much proximal to tip of Cul and $R/Cu < 1.0$, and in the structure of appendages of the hypopygium.

31. *Tanytarsus oyamai* Sasa, 1979

Eighty two (82) males were collected at #2, Yachou Koen by sweeping with insect net among which seven were confirmed as slide mounted specimens; No. 358 (#2-8), 358:16

(#2-9), 358:18 (#2-1), 358:30 (#3-4), 358:31 (#3-31), 359:66, 360:06 (#2-2), 360:40 (#2-8-2), and other preserved in 70% alcohol.

32. *Tanytarsus simantoopeus* sp. nov. (sp. A; Fig. 16)

Six males were collected with a light trap on April 26, 1998, in the town of Nakamura. Holotype: No. 358:56 (#4-16). Paratypes: 359:60, 61, 67, 361:15, 17.

Male. BL 2.50mm WL1.52m, WW/WL 0.30. body almost entirely pale, only scutal stripes and postnotum slightly yellowish. Head in Fig. 16 a. Eyes bare, each with a dorsomedial projection, ER 0.73. Frontal tubercles (Fig. 16 b) large, elongate conical, 20 microns long, 10 microns wide at the base, 33 microns apart from each other. Antenna with 13 flagellar segments, AR 1.00, AHR 0.51. Palp long, P/H 1.20. SO 8:8, CL 12. Anteprenotum (Fig. 16 c) widely separated, without seta. Distribution of setae on scutum and scutellum in Fig. 16 d; DM 8, DL 8:8, Pa 1:1, SC 4.

Wing (Fig. 16 e) with macrotrichia in the distal half, basal half bare except on the principal veins. Squama bare, anal lobe nearly flat. RR 0.43, VR 1.24, R/Cu 1.13. Tip of front tibia (Fig. 16 f) with a long, narrow and sharply pointed terminal process. Tips of middle and hind tibiae (Figs. 16g, h) with two rather narrow comb scales, both with a long spur. fLR 2.16, mLR 0.58, hLR 0.70, fTR 0.41 (very high), fBR 2.8, mBR 6.2, hBR 8.2. Pulvilli absent.

Hypopygium in Fig. 16 i. Anal point narrow, widest at base and slightly tapered to rounded apex, with lateral ridges and 4 spine clusters. Ninth tergite with 12 short setae around base of anal point. Bands of ninth tergite separated. Dorsal appendage (Fig. 16 j) nearly oval, with 2 dorsal, 2 lateral and 2 inner setae, and a basal inner seta arising on a small tubercle. Digitus (Fig. 16 j) about half as long as dorsal appendage, and situated on its inner margin. Median and ventral appendages in Fig. 16 k, the former 0.75 times as long as the latter, bearing numerous long simple setae; the latter slightly expanded apically, with 11 recurved setae and 3 caudally directed setae. Gonostylus not expanded, widest at about middle.

Remarks. This specimen is a member of the *yunosecundus* group of genus *Tanytarsus*, since anal point with lateral ridges and spine clusters, digitus present, and ventral appendage is relatively long. It is somewhat similar in structure to *T. yunosecundus* Sasa, 1984, in that dorsal appendage is egg-shaped and setae on median appendage are all simple, but in *T. yunosecundus* median appendage is longer than ventral appendage, digitus is curved, and dorsal appendage is constricted in the middle.

33. *Tanytarsus simantopequeus* sp. nov. (sp. B; Fig. 17)

Two males were collected. Holotype: No. 358:93 (#7-12). Paratype: No. 359:34 (#10-16).

Male. BL 2.36, 2.26mm, WL 1.28, 1.36mm, WW/WL 0.34, 0.34. Body almost entirely pale yellow, even scutal stripes and postnotum hardly discernible by color. Head in Fig. 17 a. Eyes bare, ER 0.36, 0.35. Very small frontal tubercles present (Fig. 17 b). Antenna with 13 flagellar segments, AR 0.59, 0.45, AHR 0.37, 0.36. P/H 0.95, 1.00. SO 10:10, 9:9, CL 16, 18. Anteprenotum (Fig. 17 c) widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 17 d. DM 13, 18, DL 10:11, 10:10, PA all 1, SC 6,6.

Wing (Fig. 17 e) with macrotrichia on almost entire surface and on the principal veins, squama bare, anal lobe nearly flat. R2+3 obscure and in contact with R4+5. FCu much distal to R-M, VR 1.71, 1.68 (very high). R/Cu 1.07, 1.05. Tip of front tibia (Fig. 17 f) with a narrow and sharply pointed terminal process. Tips of middle and hind tibiae (Figs. 17 g, h) with two separated comb scales, both with a long spur. fLR 2.29, mLR 0.56, 0.66, hLR 0.73, 0.69, fTR 0.33, fBR 3.8, mBR 6.0, 5.0, hBR 7.1, 6.0.

Hypopygium in Fig. 17 i. Anal point (also in Fig. 17 j) with a V-shaped base and parallel-sided distal process, with lateral ridges but without spine clusters. Dorsal appendage (also in Fig. 17 k) almost quadrangular, posterior margin nearly straight, with 2 inner, 3 caudolateral setae, and a basal inner seta without basal tubercle. Digitus absent. Median appendage (Fig. 17 m) composed of an extremely long and narrow shaft bearing setae on inner margin, and extremely long terminal setae extending far beyond tip of ventral appendage and reaching beyond tip of gonostylus. Ventral appendage long, finger-like and slightly expanded distally, with 12 short, recurved distal setae. Gonostylus widest near base and tapering towards pointer apex.

Remarks. This specimen is considered as a member of the genus *Tanytarsus* van der Wulp according to the structure of wings, tibial spurs and hypopygium, and is characterized especially by that anal point is narrow, bare and without spine clusters, dorsal appendage is quadrangular and without digitus, and median appendage with extremely long setae. According to the key prepared by Pinder (1978) for the British species of this genus it falls in *T. glabrescens* Edwards, but the structures of dorsal and median appendages are essentially different. In the key to Japanese members of this genus by Sasa & Kikuchi, 1995, it falls in the *usmaensis* group, since anal point without spine clusters, but none of the members of the previously known species of this group has such shape of dorsal appendage and such a long median appendage; it is also somewhat related to the *yunosecundus* group in that median appendage with extremely long setae, but previously known species of this group have spine clusters on anal point and with long digitus.

34. *Tanytarsus simantoquereus* sp. nov. (sp. C; Fig. 18)

Two males were collected. Holotype: No. 359:36 (#10–18), on April 27, 1998, with a light trap at Hiromi. Paratype: No. 359:09 (#9–5), on April 26, at Hiyoshi, by sweeping with insect net.

Male. BL 2.76, 2.76mm, WL 1.48, 1.40mm, WW/WL 0.32, 0.31. Ground color of scutum, and scutellum yellow, stripes and postnotum dark brown, legs and abdomen slightly yellowish. Head in Fig. 18 a. Eyes bare and reniform, widely apart from each other, ER 1.19, 1.35 (much larger than in most other species of this genus). Antenna with 13 flagellar segments, AR 0.72, 0.80, AHR 0.43, 0.41, P/H 1.20, 1.00. Frontal tubercles (Fig. 18 b) very small. Semicircular, 4 microns high and 4 microns wide, 38 microns apart from each other. SO 10:10, 8:8, CL 12, 12. Anteprepronotum (Fig. 18 c) widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 18 d. DM 11, 7, DL 6:7, 6:7, PA all 1. SC 2,2.

Wing (Fig. 18 e) with macrotrichia rather sparsely only in the distal half, like in genus *Cladotanytarsus*, squama bare. RR 0.46, 0.53, VR 1.33, 1.37, R/Cu 1.03, 1.06. Tip of front tibia

(Fig. 18 f) with a narrow and sharply pointed terminal process. Tips of middle and hind tibiae (Figs. 18g, h) with two separated rather narrow terminal comb scales, both with a spur. fLR 2.51, 2.48, mLR 0.58, 0.52, hLR 0.68, 0.64, fTR 0.43, 0.35, fBR 3.0, 3.4, mBR 7.3, 5.8, hBR 7.6, 7.4 Pulvilli vestigial.

Hypopygium in Fig. 18 i. Anal point wide and parallel-sided for proximal 2/3 and tapering towards pointed apex for distal 1/3, with lateral ridges and 5 or 7 spine clusters. Ninth tergite with short setae around base and on both sides of anal point. Bands of ninth tergite separated in the middle. Dorsal appendage (Fig. 18 j) composed of a wide base and sickle-shaped distal blade, with 1 or 2 strong basal setae arising on a large tubercle, and 3 short setae on dorsal side. Digitus (Fig. 18 j) very long and slightly twisted. Ventral appendage very short and stout, dorsal portion curved upwards and with 6 short setae. Median appendage (Fig. 18 k) long, composed of a basal shaft bearing simple setae on inner margin, and apical portion forked into many brush-like simple setae. Gonostylus widest at about basal 1/3, inner margin almost straight.

Remarks. This species is considered as belonging to the *yunosecundus* group of genus *Tanytarsus*, since anal point with lateral ridges and spine clusters, digitus is long and extending beyond inner margin of dorsal appendage, and median appendage is long and much extending beyond tip of ventral appendage. It is somewhat related to *T. takahasii* Kawai et Sasa, 1985 and *T. angulatus* Kawai, 1991, in that dorsal appendage is narrowed for distal half, but the shape dorsal, ventral and median appendages and digitus is quite different from the latter two species (ref. PL 45C and PL 42A of Sasa & Kikuchi, 1995).

35. *Tanytarsus simantoreseus* sp. nov. (sp. D; Fig. 19)

Six males were collected on April 27, 1998, with a light trap at Hiromi. Holotype: 359:33 (#10–15). Paratypes: 360:94, 359:81, 82, 85, 361:35.

Male. BL 2.71–3.04 (2.80 in average of 6) mm, WL 1.95–1.74 (1.69) mm, WW/WL 0.29–0.32 (0.30). Body largely yellow, scutal stripes and postnotum slightly brownish. Head in Fig. 19 a. Eyes bare, both with a narrow and long dorsomedial extension, ER 0.29–0.37 (0.32). Frontal tubercles absent. Antenna with 13 flagellar segments, AR 0.83–1.00 (0.93), AHR 0.44–0.50 (0.48). P/H 1.00–1.22 (1.08). SO 8–12 (9.7), CL 14–20 (17.0). Anteprenotum (Fig. 19 b) widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 19 c; DM 12–20 (16.5), DL 8–11 (9.9), PA all1, SC4–8 (6.5).

Wing (Fig. 19 d) with macrotrichia on almost entire surface and on the principal veins. Squama bare, anal lobe nearly flat. RR 0.52–0.70 (0.60), VR 1.52–1.71 (1.57) (very high), R/Cu 1.07–1.13 (1.10). Front tarsi both lost, fLR 2.21 (front tarsi only on one specimen) mLR 0.61–0.65 (0.62), hLR 0.67–0.70 (0.69), fTR 0.28, fBR 5.4, mBR 3.95–5.2 (4.3), hBR 5.7–9.2 (6.3). Tip of front tibia (Fig. 19 e) with a long and narrow process, tips of middle and hind tibiae (Figs. 19 f, g) with two separated comb scales, both with a spur. Pulvilli absent.

Hypopygium in Fig. 19 h. Anal point long, narrow, parallel-sided and apically rounded, without spine clusters. Dorsal appendage (Figs. 19 i, dorsal; j, ventral view) thumb-like, longer than wide and caudally rounded, with 4 inner and 5 lateral setae, and a basal seta arising on a tubercle. Digitus (Fig. 19 j) wider than long and with rounded margin. Median append-

age (Fig. 19 k) divided into two branches, a long shaft bearing numerous long setae on inner margin, and a short basal branch bearing inwards directed short setae. Ventral appendage (Fig. 19 k) finger-like, slightly expanded apically, with 10 recurved short setae. Gonostylus widest at about basal 1/3 and apically pointed.

Remarks. This specimen belongs to genus *Tanytarsus* in view of the structure of wing veins, presence of numerous macrotrichia on wing, and the structure of hypopygium and tibiae, and to the *yunosecundus* group of this genus in that median appendage is very long and reaching to beyond tip of ventral appendage, but differs from the previously known species of this group in that anal point without spine clusters, digitus is not narrow and long but much wider than long, and median appendage bears a basal process bearing short setae.

36. *Tanytarsus simantoseteus* sp. nov. (sp. E; Fig. 20)

Thirty two (32) males were collected on April 26, 1998, by sweeping with insect net, on the shore of Hiromi River. Holotype: 358:92 (#7–11). Paratypes: No. 360:30–35, 67, 359: 63 to 65, #361:16 to 22.

Male. In the measurements of the holotype, BL 2.88mm, WL 1.70mm, WW/WL 0.29. Body almost entirely pale, even scutal stripes and postnotum hardly discernible by color. Head in Fig. 20 a. Eyes bare, ER 0.41. Small frontal tubercles present (Fig. 20 b), 6 microns high, 5 microns wide, and 20 microns apart from each other. Antenna with 13 flagellar segments, AR 0.73, AHR 0.44. P/H 1.17. SO 10:10, CL 16. Anteprenotum (Fig. 20c) widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 20 d; DM 6, DL 8:8, PA 1:1, SC4.

Wing (Fig. 20 e) with macrotrichia mainly in the distal half and on the principal veins. Squama bare, RR 0.37, VR 1.19, R/Cu 1.11. Tip of front tibia (Fig. 20 f) with a long, narrow and sharply pointed terminal process. Tips of middle and hind tibiae (Figs. 20 g, h) with two separated comb scales, both with a spur. Pulvilli absent fLR 2.55, mLR 0.60, hLR 0.73, fTR 0.34, fBR 3.6, mBR 4.4. hBR 4.8.

Hypopygium in Fig. 20 i. Bands of anal tergite separated. Anal pointed (Fig. 20 j) roughly triangular, with a very wide base and apically rounded, with lateral ridges and 7 very large spine clusters on the midline. Dorsal appendage (Figs. 20 k, dorsal; 20 m, ventral view) roughly half- egg shaped and bearing 6 setae on the dorsal side, and its inner margin with a basal process bearing two setae, and a caudal process without setae; it bears a prominent process on the ventral side at the base of digitus. Digitus (Figs. 20 k, m) widest at base and extending much beyond inner margin of dorsal appendage, with rounded apex. Median appendage (Fig. 20 n) is situated at the base of ventral appendage, relatively short and bearing simple setae all directed inwards. Ventral appendage (Fig. 20 n) relatively stout, with recurved setae all arising from the dorsally curved apical portion. Gonostylus widest at about middle, inner margin nearly straight.

Remarks. This species is structurally a typical member of the genus *Tanytarsus*, and belongs to the *mendax* group, since anal point with lateral ridges and spine clusters, and median appendages are short and directed inwards. Among the species of this genus recorded from Europe, it is somewhat similar in structure to *T. niger* Anderson in that anal point is

basally broad and with broad spine clusters and lateral ridges, and median appendage is short, but *T. niger* differs essentially from the present species in the shape of dorsal appendage and digitus (ref. Pinder, 1978, Fig. 185 A). In the key to species of this group compiled by Sasa & Kikuchi (1995), the present species belongs to the *mendax* group, since anal point with lateral ridges and spine clusters, and digitus is well developed, and is similar to *T. tamaundecimus* Sasa, 1980, in that median appendage is short and with simple setae only, dorsal appendage with a large basal tubercle bearing long setae, and anal point is broad basally and apically rounded, but in *T. tamaundecimus* digitus is long, narrow and caudally directed, dorsal appendage is smoothly egg-shaped, and ventral appendage is not curved dorsally at tip.

37. *Tanytarsus simantoteuus* sp. nov. (sp. F; Fig. 21)

Two males were collected by sweeping at the side of Hiromi River on April 26, 1998. Holotype: 360 29 (#6–9–1), Paratype: No. 359:86(#10–15–14).

Male. BL 3.12mm, WL 1.82mm, WW/WL 0.32. Body almost entirely pale yellow, scutal stripes and postnotum slightly brownish. Head in Fig. 21 a. Eyes bare, ER 0.27. Antenna with 13 flagellar segments, AR 0.87, AHR 0.51. P/H 1.16. SO 10:10, CL 12. Frontal tubercles (Fig. 21 b) prominent, conical, 22 microns long and 16 microns in diameter at the base, 51 microns apart from each other. Anteprepronotum (Fig. 21 c) widely separated, without setae. Distribution of setae on scutum in Fig. 21 d; DM 12, DL 8:9, PA 2:1.

Wing (Fig. 21 e) with macrotrichia mainly on the distal half. Squama bare, anal lobe nearly flat. RR 0.27, VR 1.26, R/Cu 1.21. Tip of front tibia (Fig. 21 f) with a long, narrow and sharply pointed terminal process. Tips of middle and hind tibiae (Figs. 21 g, h) with two comb scales, both with a spur. fLR 3.05 (extremely high), mLR 0.71, hLR 0.76, fTR 0.43 (very high), fBR 3.6, mBR 4.2, hBR 5.7. Pulvilli well developed, large and brush-like, an unusual character as a member of this genus (Fig. 21 i, hind tarsus V).

Hypopygium in Fig. 21 j. Anal point (also in Fig. 21 k) complicated in structure, composed of a basal V-shaped portion with a group of recurved spines encircled by a pair of semicircular ridges, and a distal oval process. Anal point with 4 lateral setae on both sides, and 12 small setae in two longitudinal rows on the base. Dorsal appendage (Fig. 21 m) plate-like, slightly constricted near apex and posterior margin truncate, with 2 or 3 inner setae, 5 dorsal setae and 6 lateral setae. Digitus (also in Fig. 21 m) situated on the inner margin of dorsal appendage, widest at base and tapering towards apex. Median and ventral appendages in Fig. 21 n; the former nearly as long as the latter, composed of a long shaft bearing simple setae on inner margin, and numerous short and broad recurved setae on the apical portion; ventral appendage long and stout, with 10 recurved setae and 3 caudally directed setae arising from the distal portion. Gonostylus long and smoothly curved inwards.

Remarks. This species is provisionally considered as belonging to the *mendax* group of *Tanytarsus*, since anal point with lateral ridges and spine clusters, distal setae of median appendage are short and do not extend beyond tip of ventral appendage, and digitus is well developed, but quite unusual in that anal point has very complicated and unusual structure, median appendage is long but apical setae are short, leaf-like and recurved, the shape of

dorsal appendage is also unusual, and legs with large brush-like pulvilli.

38. *Tanytarsus simantouveus* sp. nov. (sp. G; Fig. 22)

A male was collected with a light trap at Hiromi on April 27, 1998. Holotype: No. 360; 92 (#10-15-2).

Male. BL 2.78mm, WL 1.51mm, WW/WL 0.32. Body almost entirely pale, scutal stripes, postnotum and hypopygium slightly yellowish. Head in Fig. 22 a. Eyes bare, ER 0.33. Frontal tubercles (Fig. 22 b) prominent, 20 microns long, 6 microns wide at the base, and 30 microns apart from each other. Antenna with 13 flagellar segments, AR 0.80, AHR 0.52. P/H 1.14. SO 11:12, CL 16. Anteprenotum (Fig. 22 c) slightly separated, without setae. Distribution of setae on scutum and scutellum in Fig. 22 d; DM 12 DL 8:8 PA 1: 1 SC 4.

Wing (Fig. 22 e) with macrotrichia mainly on the distal half, squama bare, anal lobe nearly flat. RR 0.37, VR 1.24, R/Cu 1.06. Tip of front tibia (Fig. 22 f) with a narrow and sharply pointed apical process. Tips of middle and hind tibiae (Figs. 22 g, h) with two comb scale, both with a spur. fLR 2.10, mLR 0.57, hLR 0.65, fTR 0.36, fBR 3.2, mBR 7.9, hBR 8.2. Pulvilli vestigial.

Hypopygium in Fig. 22 i. Anal point (also in Fig. 22 j) widest at base and tapering towards pointed apex, with lateral ridges and 4 lateral setae on both sides, but without spine clusters. Dorsal appendage and digitus in Fig. 22 k. Median and ventral appendages in Fig. 22 m. Gonostylus widest at about basal 1/4, inner margin nearly straight.

Remarks. This species belongs to the *usmaensis* group of *Tanytarsus*, since anal point with lateral ridges but without spine clusters. In the key to Japanese species of this group presented by Sasa & Kikuchi (1995, p. 16), it comes out to *T. uresiacutus* Sasa, 1989, since anal point long, narrow and apically pointed, bands of ninth tergite separated, and digitus is long, but *T. uresiacutus* differs from the present species especially in the shape of dorsal appendage (constricted near apex like a neck), in the shape of digitus (long, narrow and nearly straight), and in the structure of median appendage (short and with spoon-like setae).

39. *Tanytarsus simantoveweus* sp. nov. (sp. H; Fig. 23)

A male was collected with a light trap at Hiromi, on April 27, 1998, No. 360:93 (#10-15-3) was first considered as a new species, but is provisionally classified into the above species, but there exist differences in structure from the holotype, it is described here as was originally intended.

Male. BL 2.40mm, WL 1.54mm, WW/WL 0.31. Body almost entirely pale, even scutal stripes and postnotum not discernible by color. Head in Fig. 23 a. Eyes bare, ER 0.41. Frontal tubercles (Fig. 23 b) prominent, 31 microns long and 8 microns wide at the base, 52 microns apart from each other. Antenna with only 12 flagellar segments, AR 0.81, AHR 0.48. P/H 1.16. SO 8:8, CL 16. Anteprenotum (Fig. 23 c) separated, without setae. Distribution of setae on scutum and scutellum in Fig. 23 d; DM 12, DL 9:9, PA 1:1, SC 4.

Wing (Fig. 23 e) with macrotrichia mainly on the distal half, squama bare, anal lobe nearly flat. RR 0.33. VR 1.41 (very high), R/Cu 1.06. Tip of front tibia (Fig. 23 f) with a long, narrow and sharply pointed terminal process. Tips of middle and hind tibiae (Figs. 23 g, h) with two comb scales, both with a spur. Front tarsi both lost. mLR 0.57, nBR 7.3 Pulvilli

absent.

Hypopygium in Fig. 23 i. Anal point widest at base and tapering towards apex, with lateral ridges, and 3 spine clusters. Dorsal appendage and digitus in Figs. 23 j (dorsal) and k (ventral view); the former with concave inner margin, 2 setae on inner margin, 4 setae on lateral margin, and one basal seta arising on a small tubercle; digitus long, narrow, slightly curved, and extending beyond inner margin of dorsal appendage. Median appendage (Fig. 23 m) short and with a wide base, bearing 10 simple setae. Ventral appendage (Fig. 23 n) short and stout, bearing many short recurved setae on the apical portion, and 4 longer caudally directed setae. Gonostylus widest at about basal 1/4, inner margin slightly convex.

Remarks. This species belongs to the *mendax* group of genus *Tanytarsus*, since anal point with spine clusters and lateral ridges, digitus is long but median appendage short and directed inwards. In the key to species of this group, *T. shoudigitatus* Sasa, 1989, is closest to the present species, in that body is almost entirely pale, dorsal appendage elongate oval, digitus is long, median appendage with only simple setae, and frontal tubercles are prominent, but *T. shoudigitatus* differs essentially from the present species in that anal point is narrow, long and parallel-sided, spine clusters are on a single row, and the shape of median and ventral appendages are also quite different.

40. *Tanytarsus simantowexeus* sp. nov. (sp. D; Fig. 24)

A male was collected with a light trap at Hiromi, on April 27, 1998. Holotype: No. 360:94 (#10-15-4).

Male. BL 3.28mm, WL 1.78mm, WW/WL 0.31. Body almost entirely pale, scutal stripes, postnotum and legs slightly yellowish. Head in Fig. 24 a. Eyes bare, ER 0.29. Frontal tubercles absent. Antenna with 13 flagellar segments, AR 0.90. P/H 1.24. SO 13:13, CL 20. Anteprepronotum (Fig. 24 b) separated, without setae. Distribution of setae on scutum and scutellum in Fig. 24 c; DM 24, DL 8:9, PA 1:11, SC 7.

Wing (Fig. 24 d) with macotrichia densely on almost entire surface, squama bare, anal lobe nearly flat. R1 and R4+5 closely set, R2+3 almost in contact with R4+5. FCu much distal to R-M, VR 1.62 (very high). R/Cu 1.08. Tip of front tibia (Fig. 24 e) with a long, narrow and apically pointed terminal process. Tip of middle and hind tibiae (Figs. 24 f, g) with two separate comb scales, both with spur. fLR 2.20, mLR 0.60, hLR 0.71, fTR 0.31, fBR 6.7, mBR 8.2, hBR 9.2 (all tarsi with very long beards). Pulvilli vestigial.

Hypopygium in Fig. 24 h. Anal point long, narrow, nearly parallel-sided and apically rounded, with lateral ridges but without spine clusters. Ninth tergite with 12 relatively long setae around base of anal point. Bands of ninth tergite separated in the middle. Dorsal appendage and digitus in Figs. 24 i (dorsal), j (ventral view); the former constricted at base and distally at base and distally expanded, with 2 median and 5 lateral setae on dorsal side, and one long seta at the base of digitus; digitus long, broad and apically rounded, the tip slightly extended beyond inner margin of dorsal appendage. Median appendage (Fig. 24 k) composed of two processes, the basal and dorsal one short and with simple setae; the ventral process with very long shaft, and bearing long, curved apical setae and simple setae along inner margin. Ventral appendage (also in Fig. 24 k) short, with recurved setae arising from the

distally expanded portion. Gonostylus widest at about middle, inner margin straight.

Remarks. This species belongs to the *usmaensis* group of genus *Tanytarsus*, since anal point with lateral ridges but without spine clusters. It is somewhat similar to *T. usmaensis* Pagast, 1931, in that anal point is narrow and apically rounded, but *T. usmaensis* differs essentially from the present species in the shape of dorsal appendage being widest at base and semicircular, and in that median appendage is very short and not double.

41. *Tanytarsus simantoxeyeus* sp. nov. (sp. JK; Fig. 25)

Four males were collected with a light trap at Hiromi on April 27, 1998. Holotype: No. 360:96 (#10–15–6). Paratypes: No. 360:95 (#0–15–5), 361:18, 34.

Male. BL 3.30, 3.38mm, WL 1.74, 1.82mm, WW/WL 0.31, 0.32. Body almost entirely pale, scutal stripes. postnotum and legs slightly yellowish. Head in Fig. 25 a. Frontal tubercles (Fig. 25 b) prominent, 14 microns wide at the base, 29 microns long, and 34 microns apart from each other. Eyes bare, ER 0.31, 0.25. Antenna with 13 flagellar segments. AR 1.05, 0.81, AHR 0.45, 0.47. P/H 1.05, 1.08. SO 8:8, 12:12, CL 9,16. Anteprepronotum (Fig. 25 c) slightly separated, without setae. Distribution of setae on scutum and scutellum in Fig. 25 d; DM 10, DL 8:9, PA 1:1, SC 6.

Wing (Fig. 25 e) with macrotrichia on almost entire surface and on the principal veins, squama bare, anal lobe obtuse. RR 0.40, 0.34, VR 1.27, 1.34, R/Cu 1.11, 1.09. Tip of front tibia (Fig. 25 f) with a narrow and sharply pointed terminal process. Tips of middle and hind tibiae (Figs. 25 g, h) with two comb scales, both with a spur. fLR 3.28 (very high) hLR 0.79, fTR 0.44, hBR 3.3. Pulvilli vestigial.

Hypopygium in Fig. 25 i. Ninth tergite with a peculiar and complicated three processes overhanging anal point (Fig. 25 J). Anal point (AP) is relatively stout simple horn without lateral ridges and without spine clusters; the basal process (B) is composed of a bundle of curved spines; the middle process (M) is a bare elongate oval shaft bearing one long basal seta and another long apical seta; the distal process (D) is a long curved bare shaft with deeply curved marks. Bands of ninth tergite separated. Dorsal appendage and digitus in Figs. 25 k, dorsal; m, ventral view; the former elongate oval, with 4 setae on inner margin, 3 setae on dorsal surface, 5 setae on lateral margin, and 1 basal seta arising on a large tubercle; digitus long, wide, slightly curved and apically pointed. Median and ventral appendages in Fig. 25 n; the former nearly as long as the latter, with short simple setae on inner margin and short, curved and spine-like setae on the apical portion; ventral appendage very long and slender, with 15 short, recurved setae in the apical portion. Gonostylus long, widest at about middle and inner margin slightly concave.

Remarks. The species belongs to the *kirai* group of genus *Tanytarsus* in the sense of Sasa & Kikuchi (1995, p. 134) since anal point without lateral ridges and without spine clusters, but is quite peculiar in that ninth tergite with three complicated processes on the base of anal point which are not seen in other species, and also characteristic in the structure of dorsal, median and ventral appendages.

Additional specimen of *Tanytarsus simantoquereus* sp. nov. (Fig. 26)

A male was collected with a light trap at Hiromi on April 27, 1998, No. 360:100 (#10

—19—4). This was considered first as a new species, but is described here as an additional paratype specimen of *T. simantoquereus*.

Male. BL 2.06mm, WL 1.30mm (both very small), WW/WL 0.33. Ground color of scutum yellow, stripes, scutellum and postnotum brown, leg segments and segments and abdomen slightly yellowish. Head in Fig. 26 a. Eyes bare, reiform and without dorsomedial extension, ER 1.46 (unusual as a species of *Tanytarsus*). Very small frontal tubercles present, 4 microns wide and 3 microns high, and 21 microns apart from each other (Fig. 26 b). Antenna with 13 flagellar segments, AR 0.67, AHR 0.46. P/H 1.17. SO 8:8, CL 12. Antepnotum (Fig. 26 c) widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 26 d; DM 6, DL 6.6, PA 1:1, SC only 2.

Wing (Fig. 26 e) with macrotrichia rather sparsely, only on the distal half, squama bare. RR 0.46, VR 1.33, R/Cu 1.03. Tip of front tibia (Fig. 26 f) with a narrow and sharply pointed terminal process. Tips of middle and hind tibiae (Figs. 26 g, h) with two rather narrow comb scales, both with a spur. Front and middle tarsi lost, hLR 0.63. Pulvilli absent.

Hypopygium in Fig. 26 i. Anal point (also in Fig. 26 j) widest at base, distal process nearly parallel-sided, with lateral ridges and 3 large spine clusters. Bands of ninth tergite separated. Dorsal appendage (Fig. 26 k) sickle-shaped, inner margin strongly concave, with 3 lateral and 1 inner setae on dorsal side, and a long basal seta arising on a large tubercle. Digitus (Fig. 26 k) long, simple, and extending much beyond inner margin of dorsal appendage. Median and ventral appendages in Fig. 26 m; the former long, distal setae extending much beyond tip of ventral appendage; ventral appendage stout, expanded and dorsally curved at apex, with 12 recurved setae arising at the distal portion. Gonostylus widest at about basal 1/3, inner margin almost straight.

Remarks. This specimen was considered first as a new species closely related to *T. simantoquereus* sp. nov., since body size is smaller, AR is also smaller, the number of spine clusters are only 3, digitus is straight, and basal seta of dorsal appendage is only 1. However, it is now considered safer that such differences could occur as individual variations within the same species. The present specimen is also very characteristic in that eyes without dorsomedial extension and ER is very high, frontal tubercles are minute, wing with macrotrichia only in the distal portion like in *Cladotanytarsus*, dorsal appendage with strongly concave inner margin, median appendage is very long and with many long, simple and caudally directed setae.

42. *Tanytarsus simantoyezus* sp. nov. (sp. M; Fig. 27)

Four males were collected, all on April 27, 1998, with a light trap, at Hiromi. Holotype: No. 361:33 (#10—15—8). Paratypes: No. 361:34 (#10—15—9), 359:83 (#10—15—13), 359:84 (#10—15—14).

Male. BL 3.08—3.18 (3.12 in average of 4)mm, WL 1.62—1.68 (1.65) mm, WW/WL 0.31—0.32. Body almost entirely pale yellow, even scutal stripes and postnotum hardly discernibly by color. Head in Fig. 27 a. Eyes bare, ER 0.35—0.54 (0.44). Frontal tubercles (Fig. 27 b) prominent, long and conical, 45 microns long, 14 microns wide at the base, and 55 microns apart from each other in the holotype. Antenna with 13 flagellar segments, AR 0.62

—0.85 (0.76), AHR 0.43–0.45 (0.44). P/H 1.16–1.27 (1.22). SO 8–10 (9.0), CL 9–16 (13.3). Anteprenotum (Fig. 27 c) widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 27 d; DM 10–18 (14.0), DL 12–10 (13.1), PA all 1, SC 4–8 (6.0).

Wing (Fig. 27 e) clothed with macrotrichia on entire membrane and on main veins, squama bare. RR 0.36–0.44 (0.41), VR 1.28–1.40 (1.33. very high), R/Cu 1.02–1.08 (1.05). Tip of front tibia (Fig 27 f) with a long, narrow and apically pointed terminal spur. Tips of middle and hind tibiae (Figs. 27 g, h) with two comb scales, one with a long spur, the other without spur. fLR 2.80 (front tarsi left only in the holotype), mLR 0.68–0.76 (0.72), hLR 0.75 (LR all very high), fTR 0.40, fBR 3.6, mBR 3.8–5.2 (5.3), hLR 0.54. Pulvilli well developed. Brush-like (Fig. 27 i, middle tarsus V).

Hypopygium in Fig. 27 j. Anal point (also in Fig. 27 k) long, narrow and parallel-sided, with two spine clusters, lateral ridges very complicated in structure, with a pair of rectangular and horn-like processes on both sides of the base, with small spine group and many short setae around the base. Bands of ninth tergite united in the middle (an unusual character). Dorsal appendage and digitus in Fig. 27 m (dorsal and ventral view). The former roughly oval but lateral margin slightly concave with 3 inner and 8 dorsal setae. Digitus long, nearly parallel-sided and extending beyond inner margin of dorsal appendage. Median and ventral appendages in Fig. 27 n. The former nearly as long as ventral appendage, with short simple setae along inner margin and short, broad and apically pointed setae on lateral margin of the distal portion. Ventral appendage short and stout, apically expanded, with 16 short recurved setae and 4 short, caudally directed setae on the apical portion. Gonostylus very long and slender, inner margin slightly concave, with some 14 short setae along inner margin.

Remarks. This species is also a typical member of the genus *Tanytarsus*, but is characteristic in that frontal tubercles are very large, the numbers of DM and DL are relatively high, legs with well developed brush-like pulvilli. The structure of hypopygium is quite different from all the previously known species of this genus; especially, anal point with only 2 spine clusters and lateral ridges are highly complicated, with spine groups on base; median appendage with a row of short leaf-like setae on lateral margin; dorsall appendage is roughly oval and digitus is long and straight.

Key to species of *Tanytarsus* collected in the Shimanto River basin

- | | |
|--|---------------------------|
| 1–Ninth tergite with 3 processes overhanging anal point; anal point broadest at base and roughly triangular, without spine clusters and lateral ridges; dorsal appendage with rounded posterior margin; median appendage about as long as ventral appendage, distal setae very short and recurved; frontal tubercles prominent; AR 0.81–1.05, fLR 3.28 (Fig. 25) | <i>simantoxeyeus</i> (JK) |
| –Ninth tergite without processes overhanging anal point | 2 |
| 2–Anal point with spine clusters between lateral ridges | 3 |
| –Anal point without spine clusters | 9 |
| 3–Anal point with small spine clusters separated from each other | 4 |
| –Anal point with a compact group of many leaf-like spines surrounded by a circular ridge; median appendage composed of a long shaft bearing very short recurved apical setae and | |

short simple setae on inner margin; dorsal appendage with convex inner margin and truncate posterior margin; digitus short and triangular; eyes with dorsomedial extension as usual, ER 0.27, AR 0.87, fLR 3.05 (Fig. 21) *simantoteuus* (F)

4–Shaft of median appendage short, distal setae ending much proximal to tip of ventral appendage

–Shaft of median appendage long, distal setae reaching to near tip or beyond tip of ventral appendage; anal point parallel-sided and apically pointed, with 3–7 small spine clusters; median appendage with long shaft, and with relatively short caudally directed simple setae; dorsal appendage with strongly concave inner margin, apical portion strongly curved inwards; digitus long and narrow; eyes reniform, ER 1.19, 1.35; AR 0.72, 0.80, fLR 2.51, 2.48 (Fig. 18) *simantoquereus* (C)

5–Digitus short and small, entirely hidden under dorsal appendage when observed from dorsal side; dorsal appendage with convex inner margin and constricted near apex, forming like a neck and head; anal point narrow and parallel-sided; frontal tubercles prominent *oyamai* Sasa, 1979

–Digitus longer and extending beyond inner margin of dorsal appendage 6

6–Digitus widest at base and triangular; dorsal appendage constricted near apex and apically forming a rounded process; frontal tubercles very small; anal point widest at base V-shaped; ER 0.41, AR 0.73, fLR 2.55 (Fig. 20) *simantoseteus* (E)

–Digitus narrow, long and parallel-sided; dorsal appendage with broad and rounded apex, not constricted near apex 7

7–Anal point narrow and parallel-sided, with spine clusters situated on a median line; dorsal appendage roughly oval in shape 8

–Anal point widest at base and tapering towards apex, with 3 spine clusters forming a triangle; dorsal appendage with strongly concave inner margin; frontal tubercles long and prominent; ER 0.41, AR 0.81 (Fig. 23) *simantoveweus* (H)

8–Anal point with 2 spine clusters, lateral ridges complicated in structure, with two complicated processes as base, and with numerous spines on the base; median appendage with short leaf-like setae on inner side; dorsal appendage roughly circular, about as long as wide; frontal tubercles very long; ER 0.35–0.54, AR 0.62–0.85, fLR 2.80 (Fig. 27)

simantoyezeus (M)

–Anal point 4 spine clusters situated on a longitudinal line, lateral ridges simple, without spines at the base; dorsal appendage oval, longer than wide; frontal tubercles smaller, ER 0.73, AR 1.00, fLR 2.16 (Fig. 16) *simantoopeus* (B)

9–Median appendage short and stout, apical setae not extending beyond tip of ventral appendage; anal point widest at base and tapering towards pointed apex; digitus very long, S-shaped; dorsal appendage roughly quadrangular, with a small apical process; frontal tubercles prominent; ER 0.33, AR 0.80, fLR 2.10 (Fig. 22) *simantouweus* (G)

–Median appendage long, the shaft or the apical setae extending much beyond tip of ventral appendage; anal point narrow and parallel-sided, with rounded apex 10

10–Median appendage divided into two processes, the basal and dorsal one very short and

- setae are directed inwards, the ventral one very long and the shaft of apical setae extending much beyond tip of ventral appendage; digitus present 11
- Median appendage composed of a single process; dorsal appendage elongate quadrangular. Digitus absent; apical setae of median appendage very long and curved inwards; frontal tubercles very small; ER 0.36, 0.36, AR 0.59, 0.45, VR 1.71, 1.68 (very high), fLR 2.29 (Fig. 17) *simantopequeus* (B)
- 11-Dorsal appendage widest as base and roughly triangular; digitus wider than long and apically rounded; frontal tubercles absent; ER 0.29, AR 1.00 (Fig. 19) *simantoreseus* (D)
- Dorsal appendage widest as about middle and basally constricted; digitus long and stout, apically rounded; frontal tubercles also absent; ER 0.29, AR 0.90, fLR 2.20 (Fig. 24) *simantowexeus* (I)

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All the reference in the taxonomy and identification of the Chironomidae of Japan are listed in the following two monographs, together with the methods of collection, preparation and identification, and keys to species identification.

- 1) Sasa, M. & Kikuchi, M. (1995): Chironomidae of Japan. University of Tokyo Press, 333 pp.
- 2) Sasa, M. (1998): Chironomidae of Japan, 1998. 156 pp. Kankyou Fukushi Kenkyuusho, 135-3, Aramata, Kurobe-shi, 938-0001

A review on the geography and biological studies on the Shimanto River area is described in

- 3) Sawada, Yoshinaga (1992), "Seiryuu Shimantogawa", 143 pp NHK Books

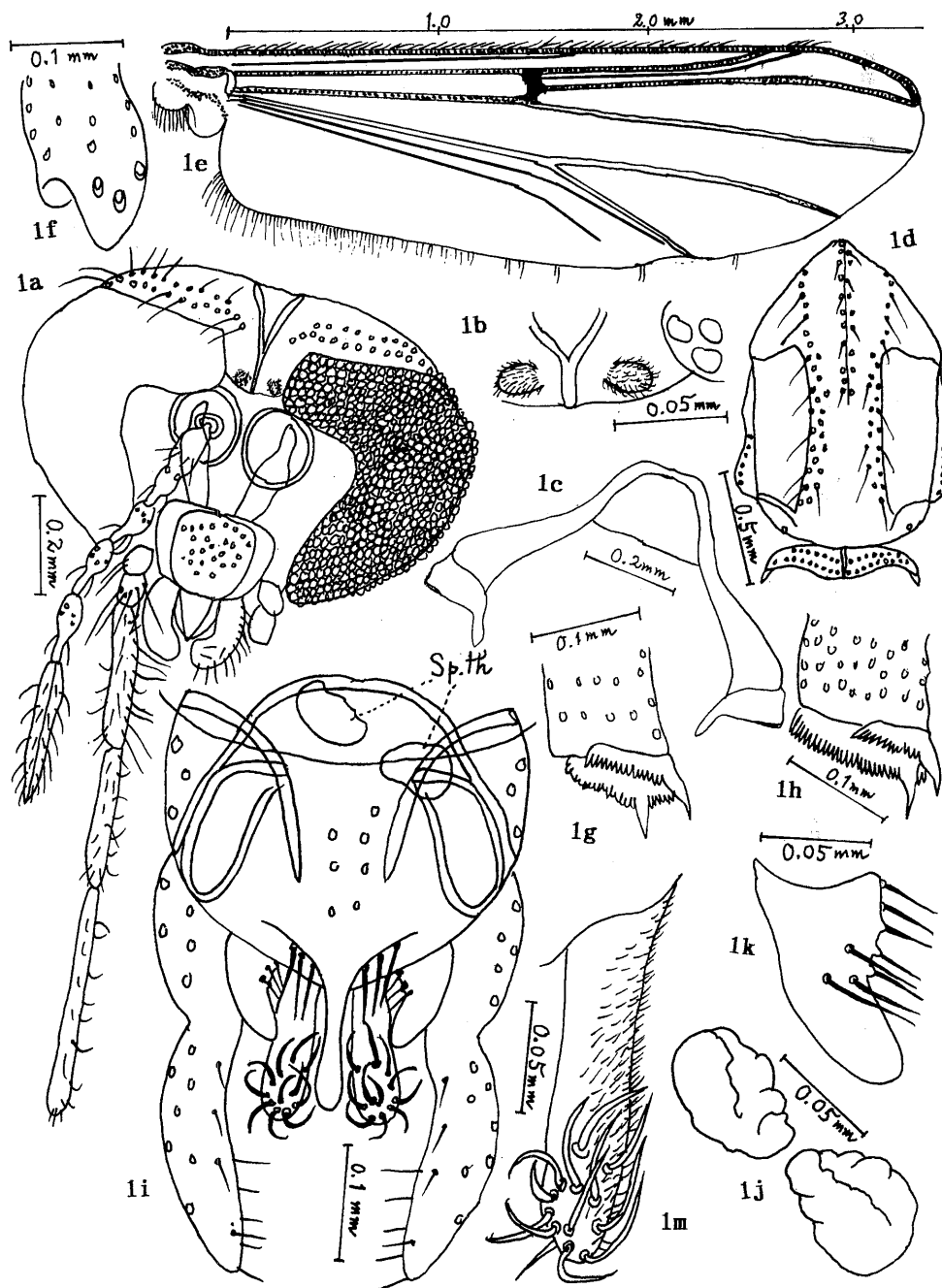


Fig. 1. *Chironomus* sp. "simantoabeus", a mosaic specimen

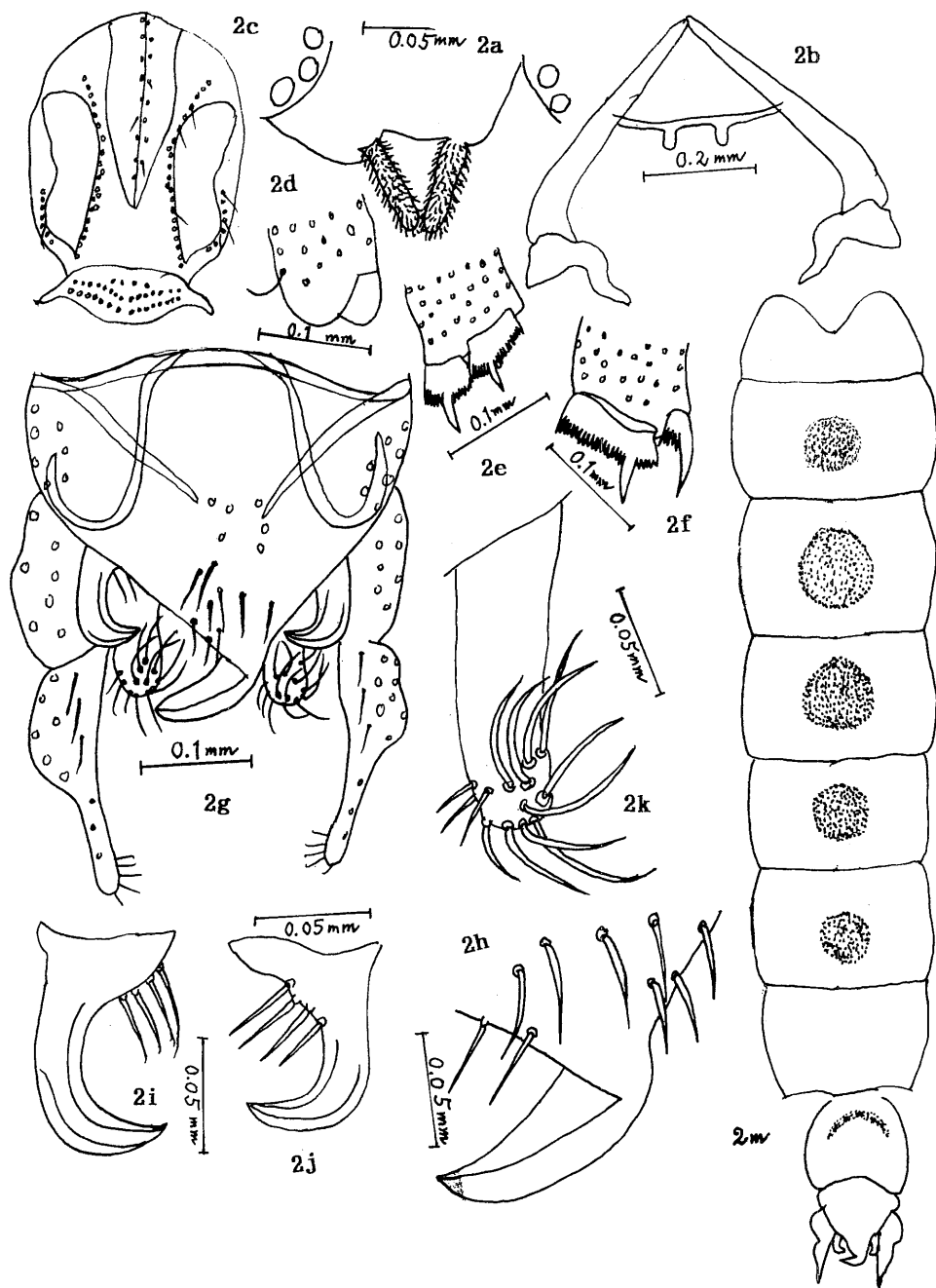


Fig. 2. *Chironomus simantobeceus* sp. nov.

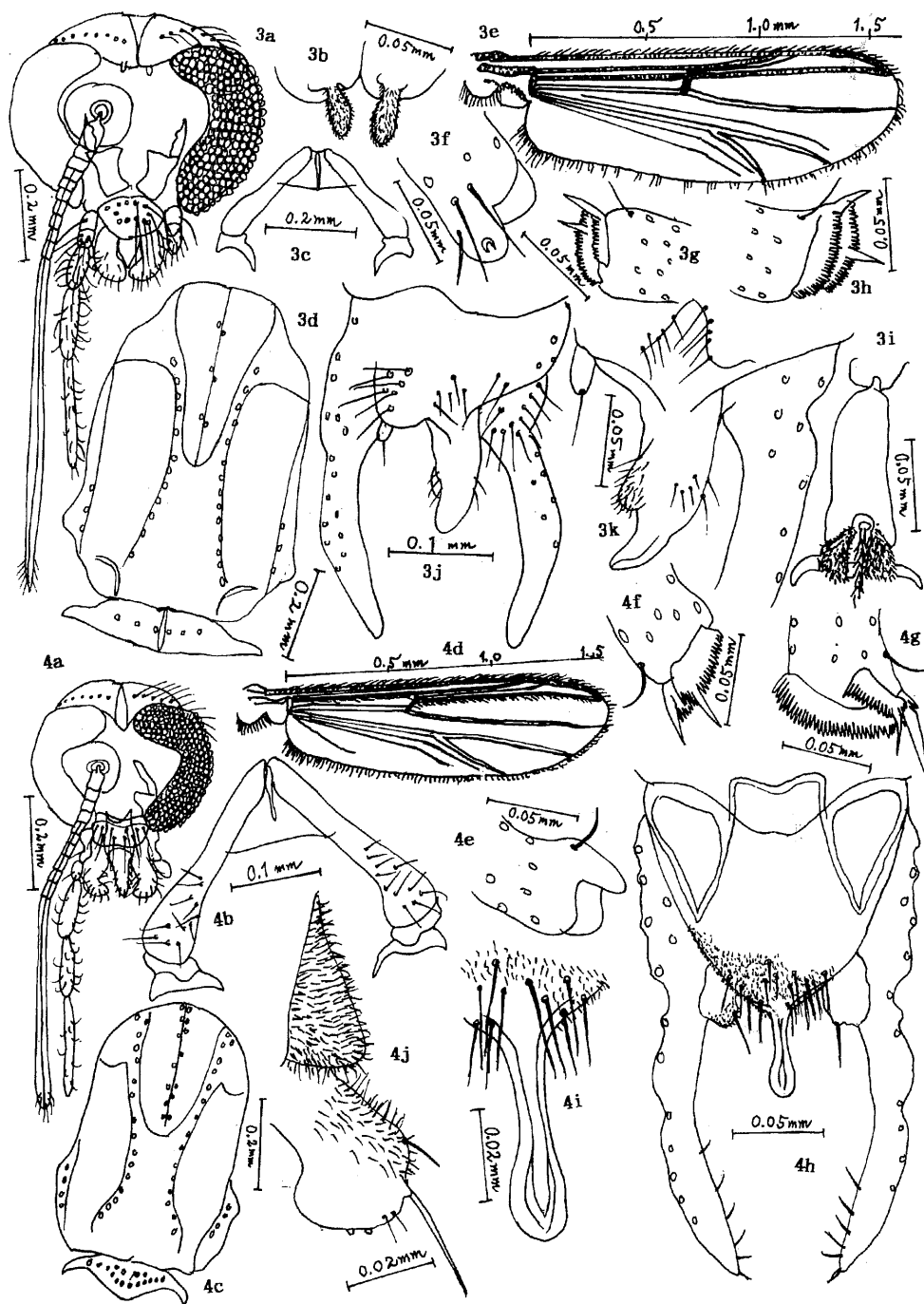


Fig. 3. *Harnischia simantodea* sp. nov.

Fig. 4. *Paracledopelma simantodea* sp. nov.

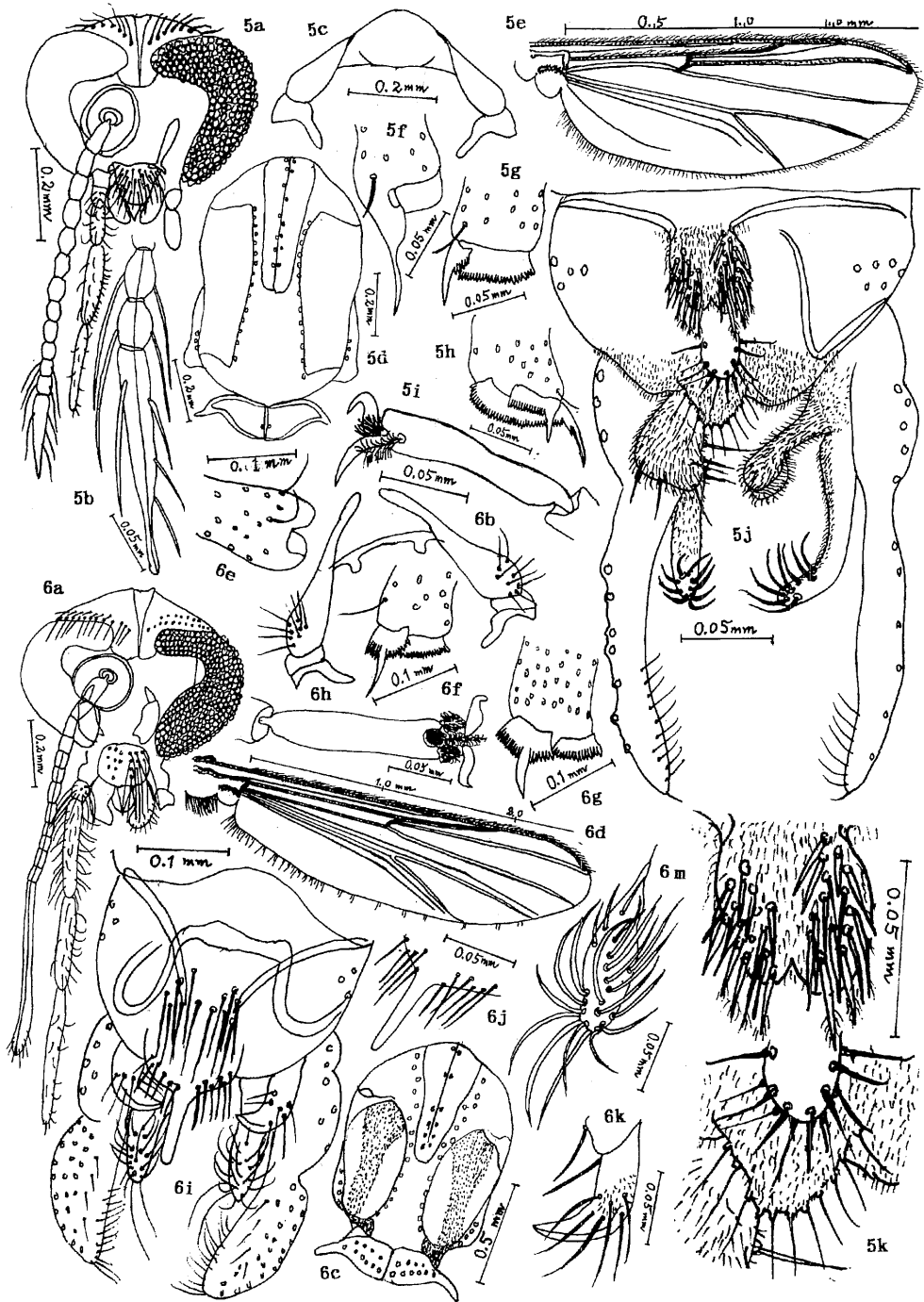


Fig. 5. *Tosayusurika simantoefta* gen. et sp. nov.

Fig. 6. *Microtendipes simantofeagus* sp. nov.

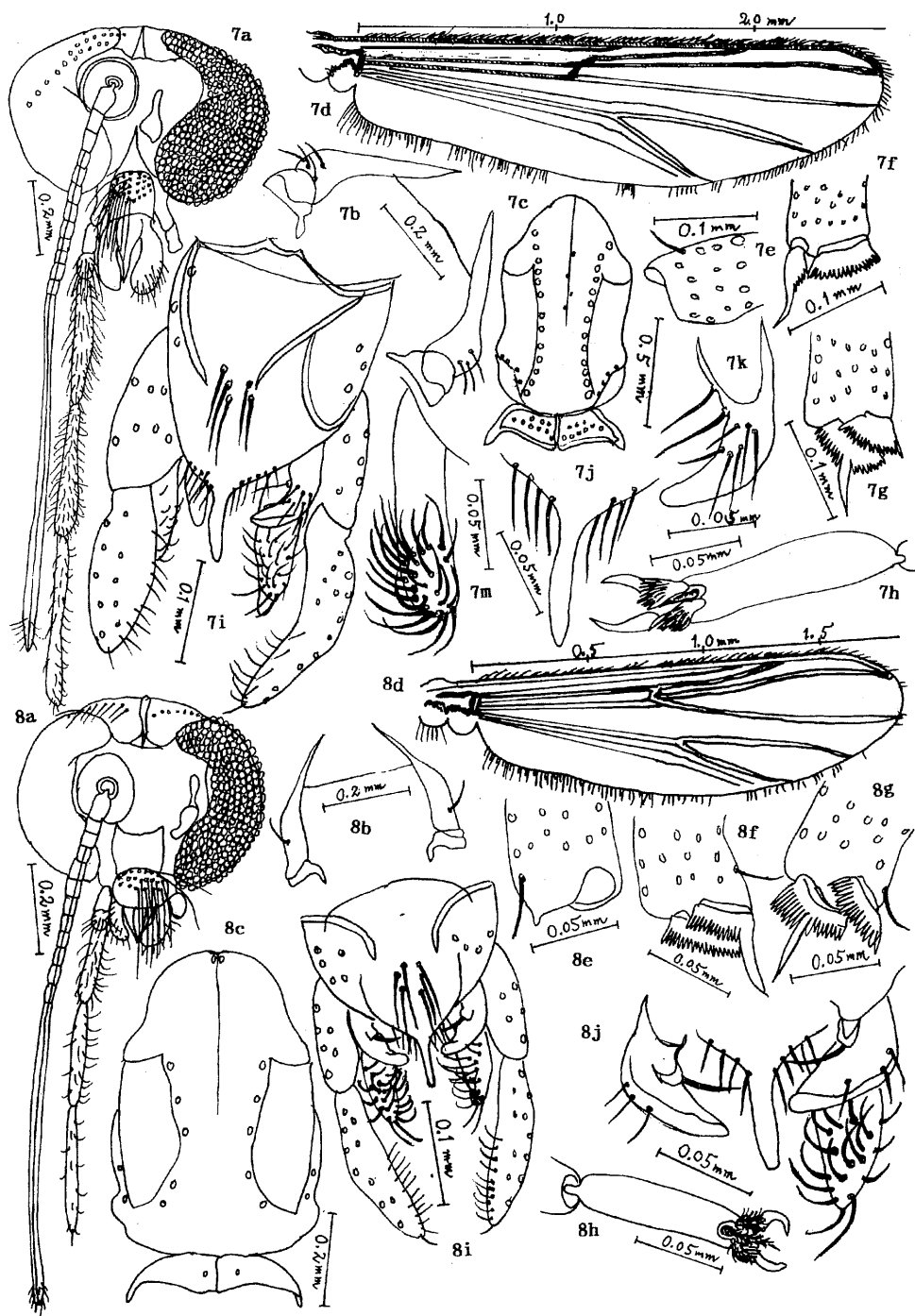


Fig. 7. *Microtendipes simantogheus* sp. nov.

Fig. 8. *Microtendipes truncatus* Kawai et Sasa, 1985

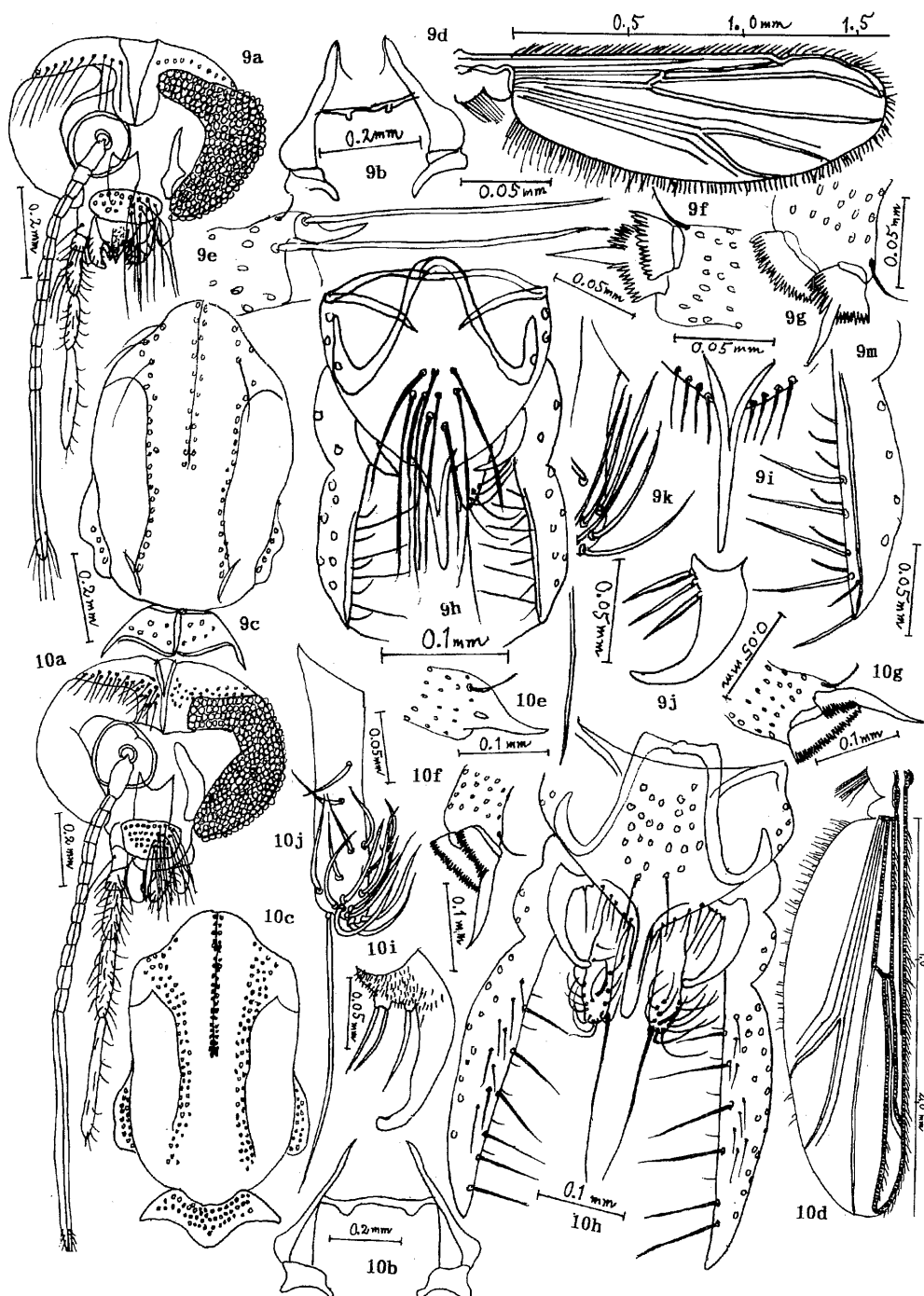


Fig. 9. *Polypedilum simantoheium* sp. nov.

Fig. 10. *Polypedilum simantoijeum* sp. nov.

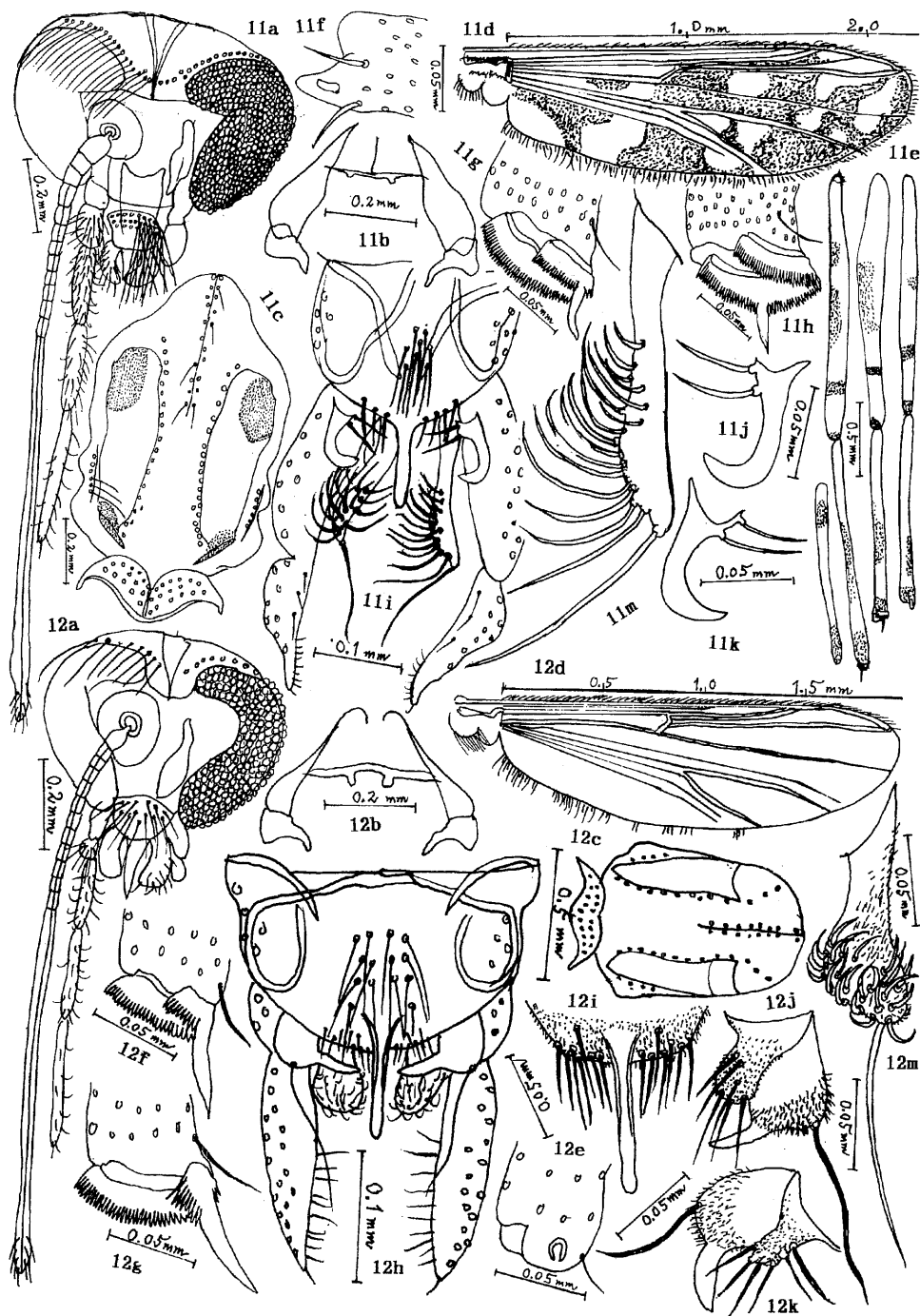


Fig. 11. *Polypedium simantomaculatum* sp. nov.

Fig. 12. *Polypedium simantokeleum* sp. nov.

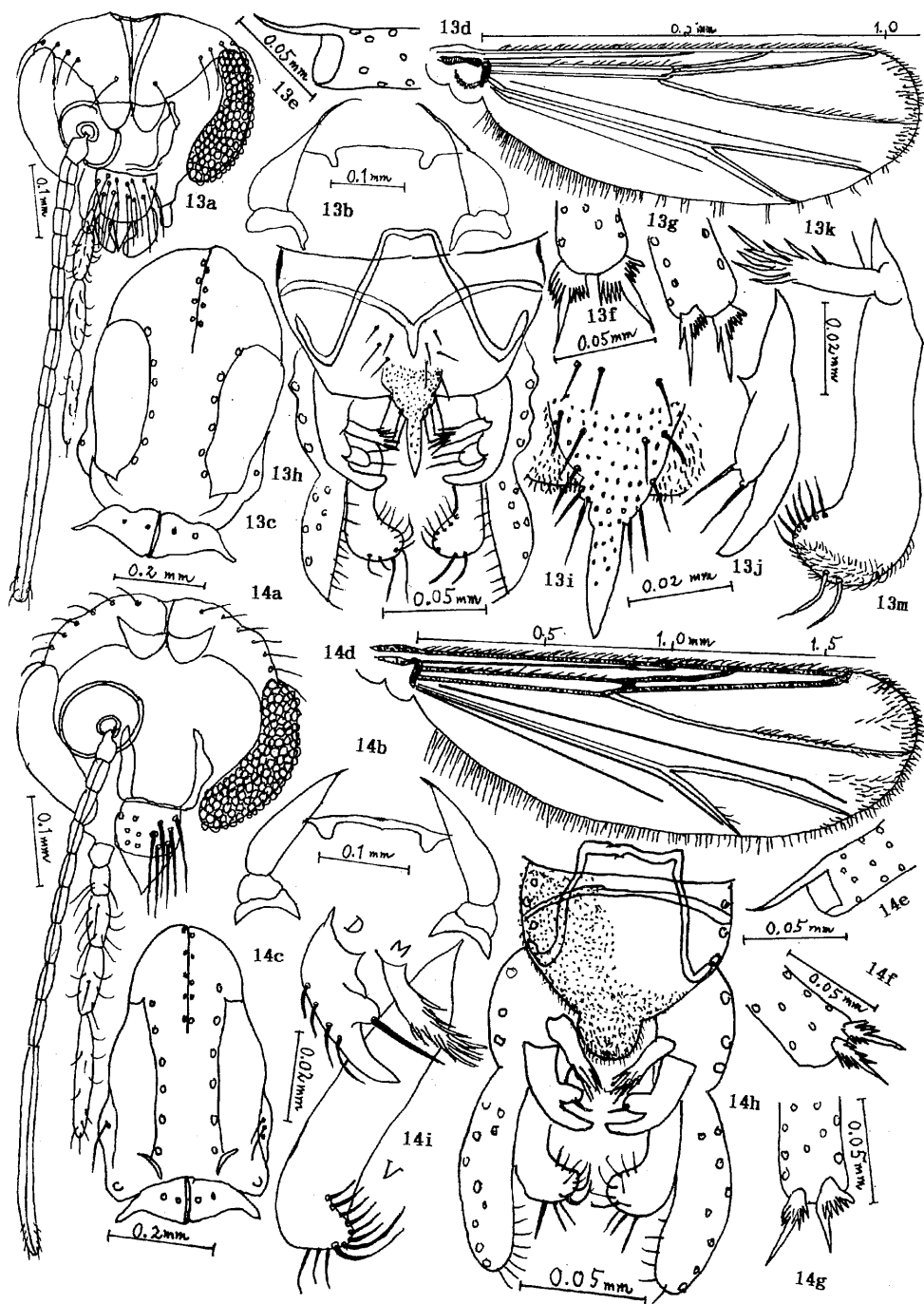


Fig. 13. *Cladotanytarsus simantolemeus* sp. nov.

Fig. 14. *Cladotanytarsus simantomeneus* sp. nov.

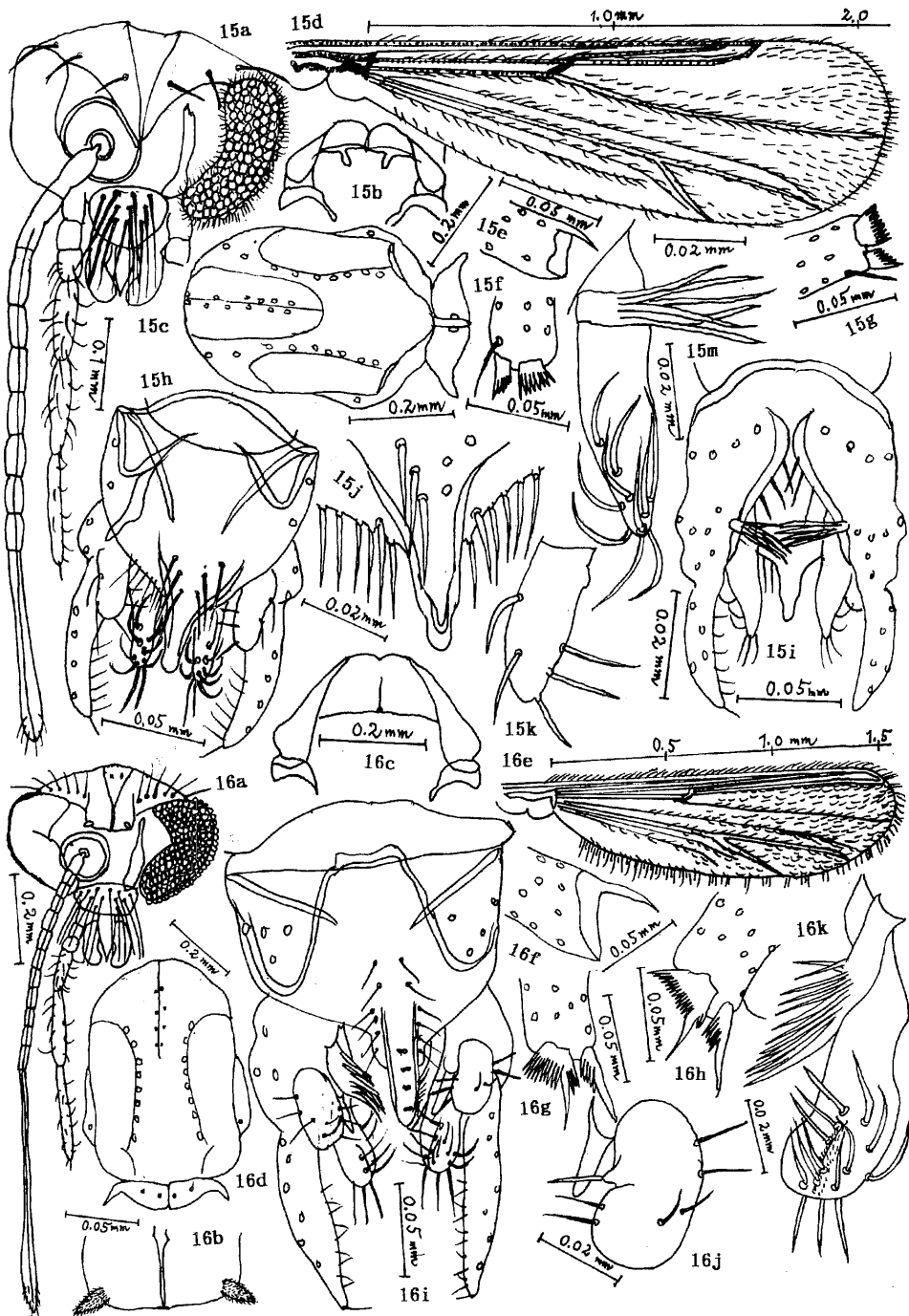


Fig. 15. *Micropsectra simantoneoa* sp. nov.

Fig. 16. *Tanytarsus simantoopeus* sp. nov. (A)

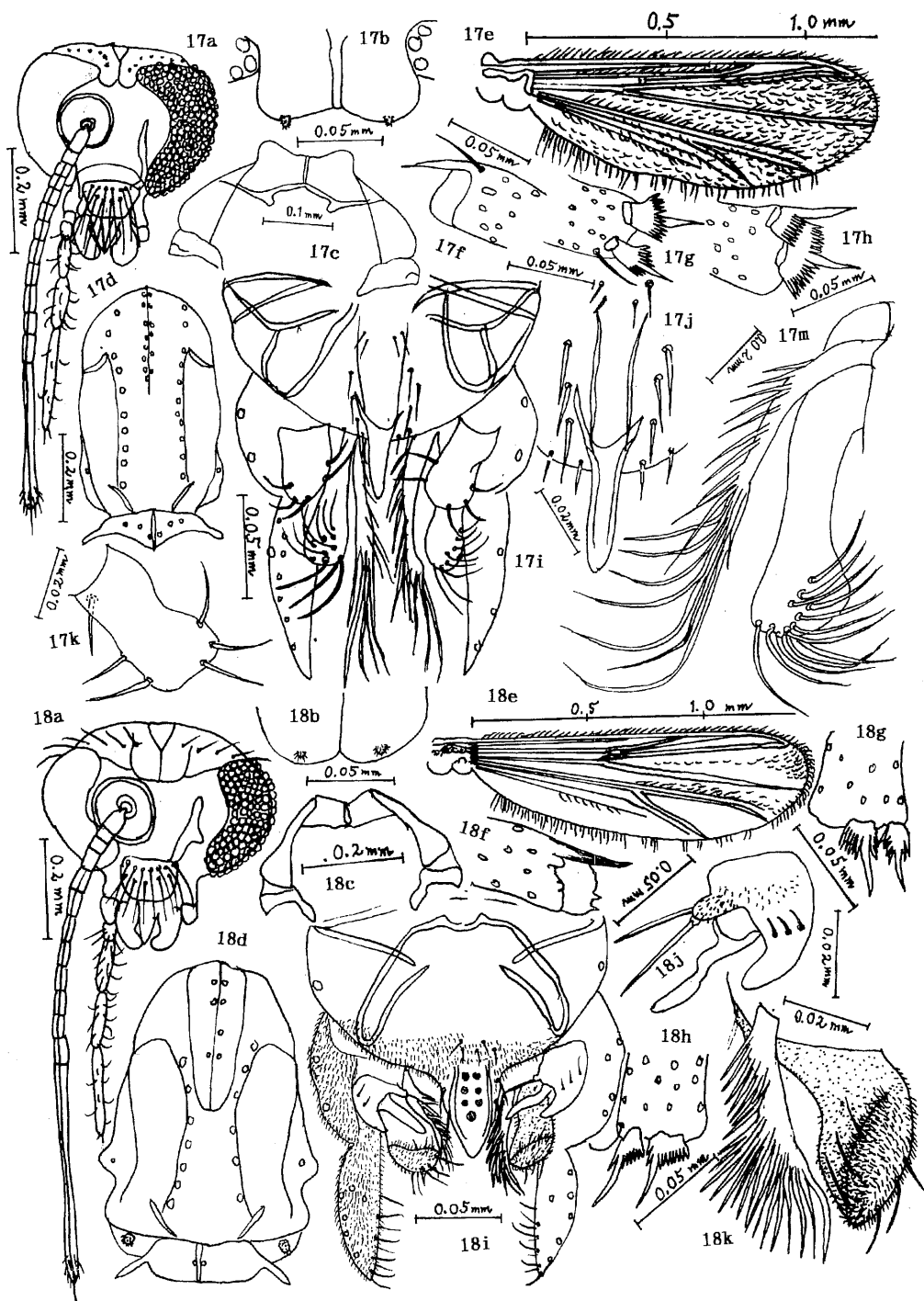


Fig. 17. *Tanytarsus simantopequeus* sp. nov. (B)

Fig. 18. *Tanytarsus simantoquereus* sp. nov. (C)

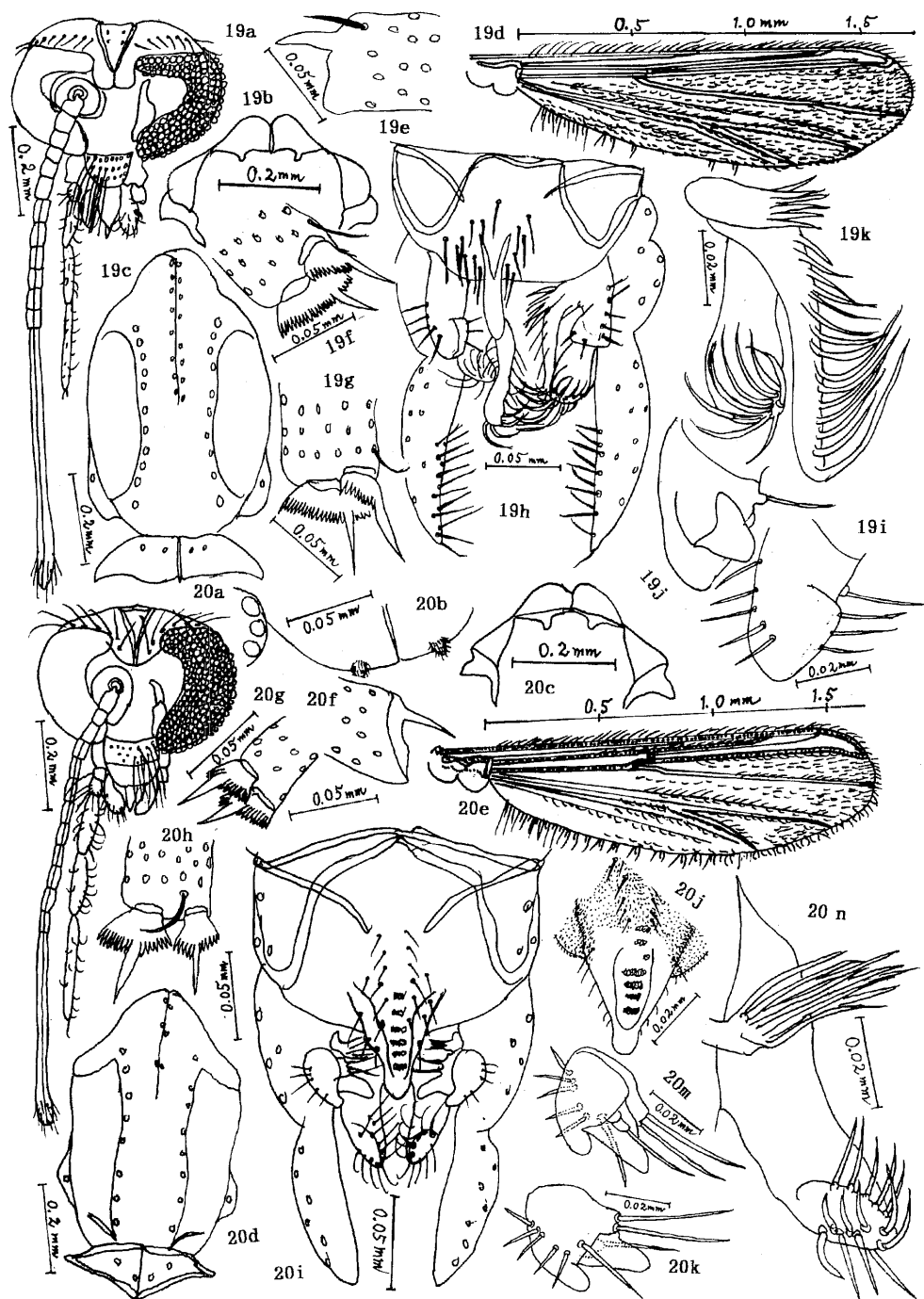


Fig. 19. *Tanytarsus simantoreseus* sp. nov. (D)

Fig. 20. *Tanytarsus simantoseteus* sp. nov. (E)

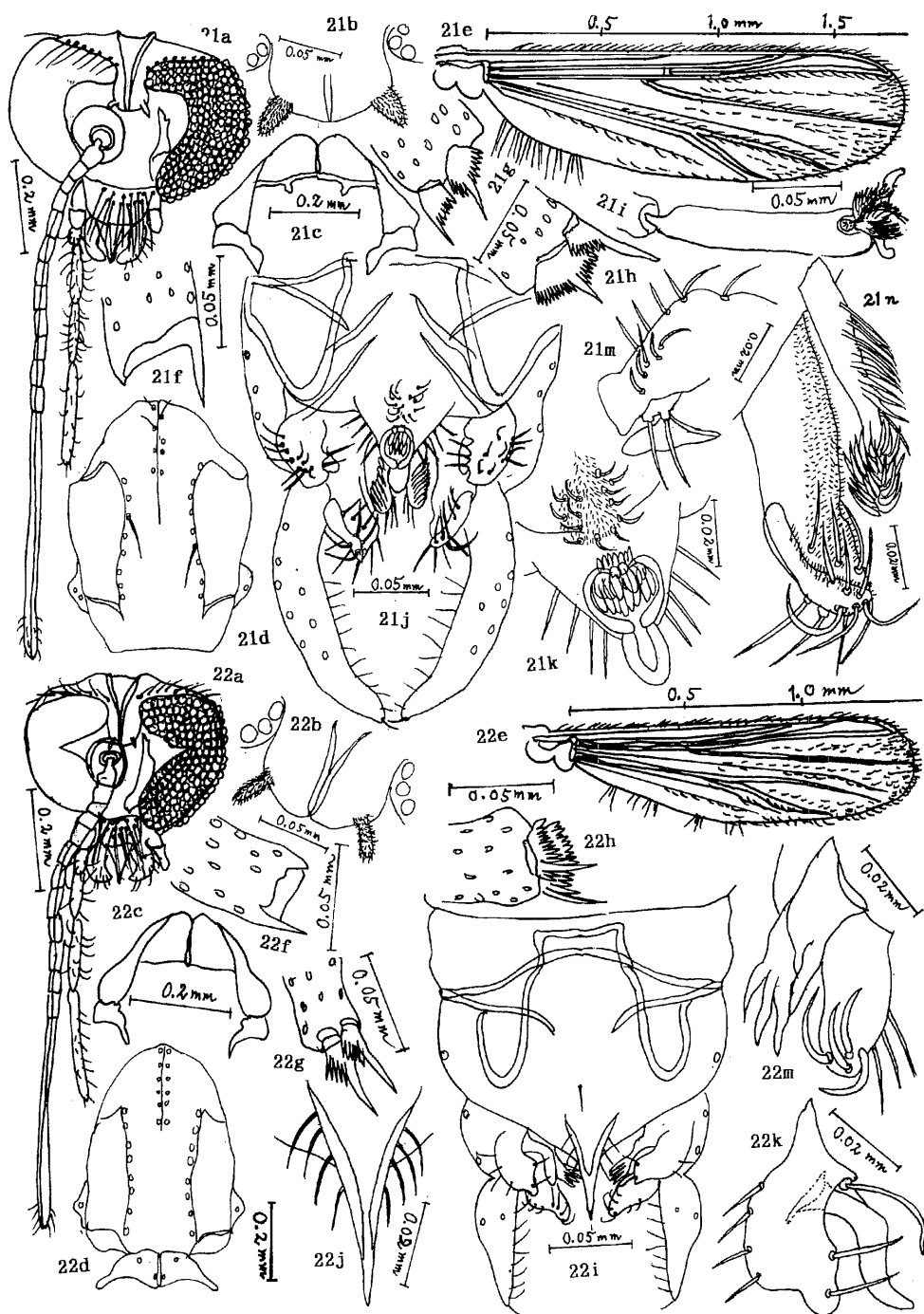


Fig. 21. *Tanytarsus simantoteuus* sp. nov (F)

Fig. 22. *Tanytarsus simantouveus* sp. nov. (G)

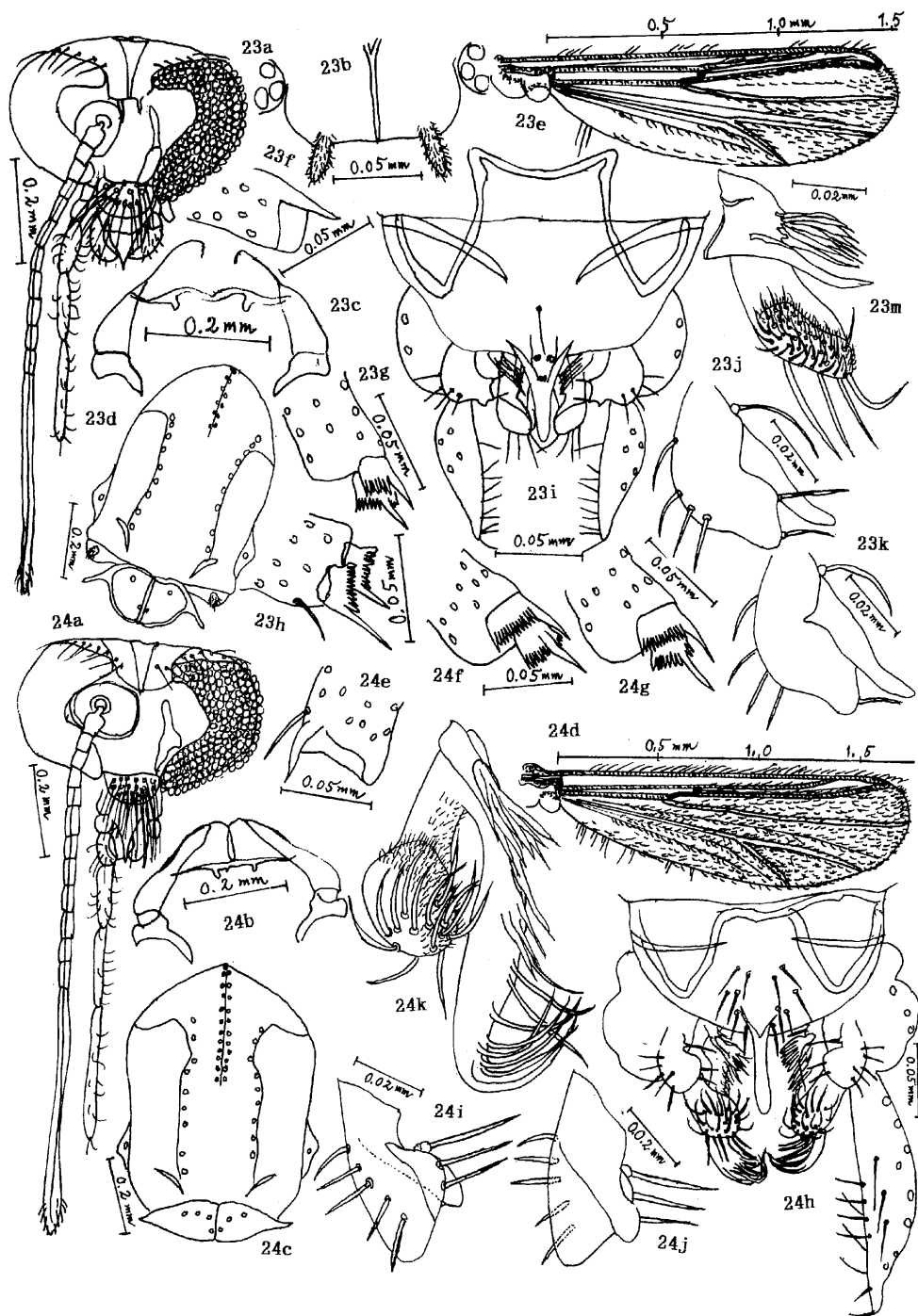


Fig. 23. *Tanytarsus simantoveweus* sp. nov. (H)

Fig. 24. *Tanytarsus simantowexeus* sp. nov. (D)

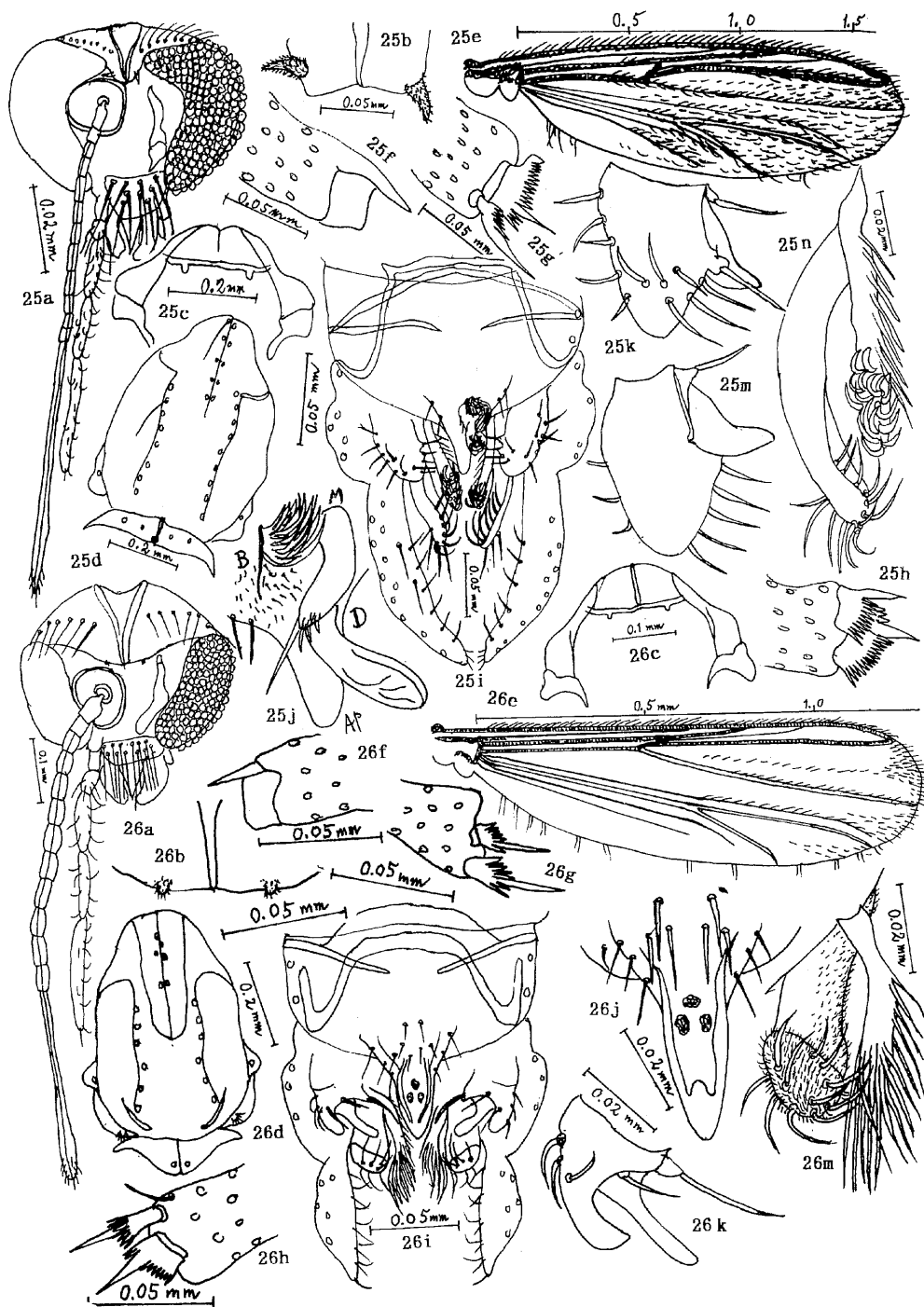


Fig. 25. *Tanytarsus simantoxeyeus* sp. nov. (JK)

Fig. 26. *Tanytarsus simantogereus* sp. nov., (C), additional specimens

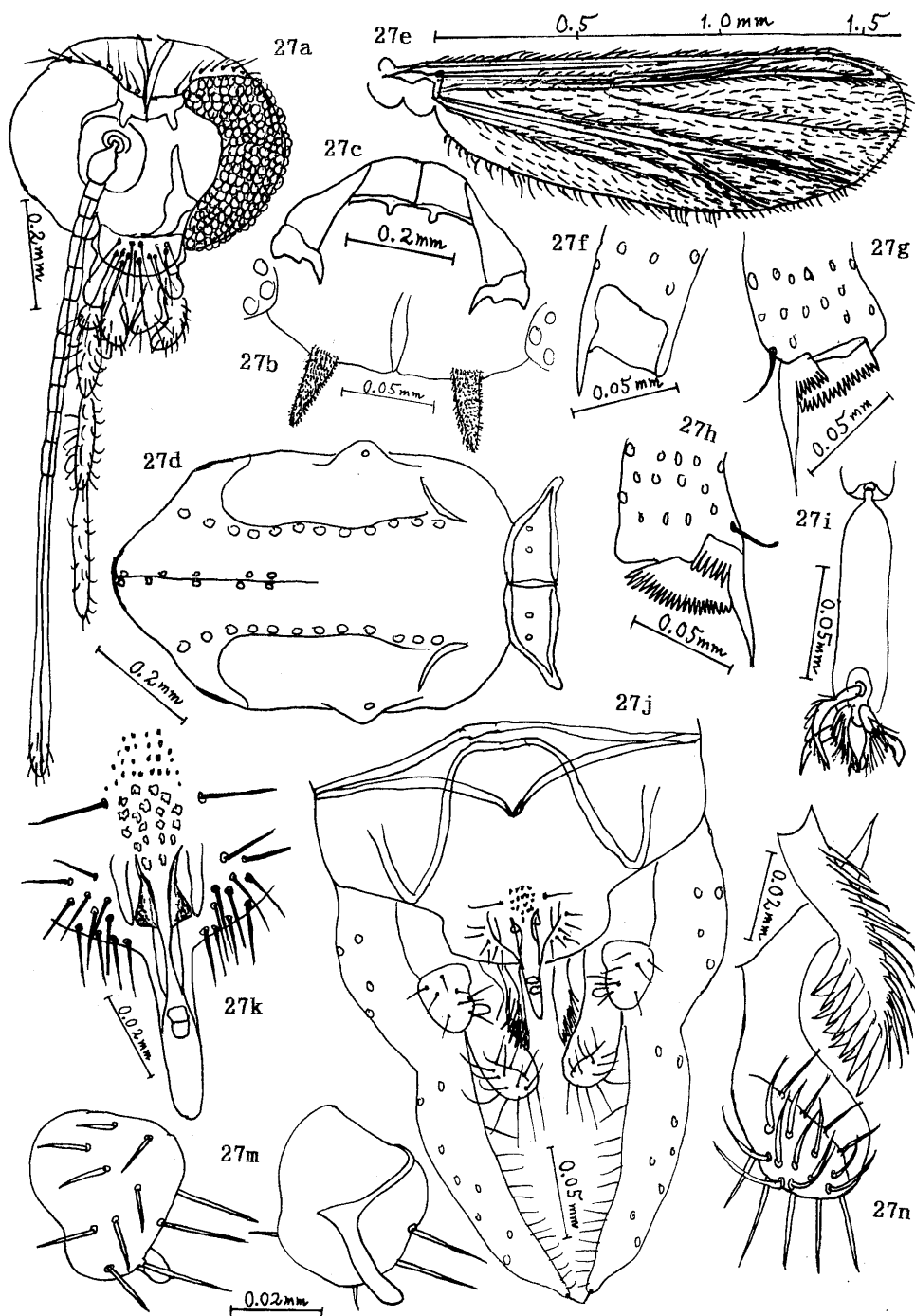


Fig. 27. *Tanytarsus simantoyezus* sp. nov. (M)